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OF THE

ROYAL HORTICULTURAL SOCIETY

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F. J. CHITTENDEN, F.L.S., V.M.H.

VOL. LXIV.

1939

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NOTICE TO BINDER.

Volume LXIV has been issued in twelve parts. Parts 2 to 12 each consists of the "Journal" proper, paged with Arabic figures, and "Extracts from the Proceedings," paged with Roman figures. The title and contents should be placed first and be followed by Part 1 and the following eleven parts of the "Journal" proper, then the ten parts of "Extracts from the Proceedings."

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV Part 1

January 1939

CALENDAR, 1939.

NOTE 1.—Meetings of the Society are held, with very few exceptions, on alternate Tuesdays throughout the year, accompanied on each occasion by a Show of plants, flowers, etc. All meetings, except the Great Spring Show at Chelsea, will be held in the Society's Halls. Fellows' tickets admit to all the Shows mentioned in this Calendar, except that on Tuesday, May 16, for which special tickets will be issued.

The price of admission for Non-Fellows to the ordinary Fortnightly Meetings is:

For two-day Shows, 2*s*. 6*d*. on the first day, up to 6 P.M.
1*s*. 0*d*. „ „ after 6 P.M.
1*s* 0*d*. on the second day.
For one-day Shows, 2*s*. 6*d*. all day.

A fully-licensed Restaurant is available for Fellows and friends.

NOTE 2.—*Fellows are requested to note that the Fortnightly Shows will open at 12 noon. The Daffodil Show, the Early Market Produce Show and the Fruit and Vegetable Show will open at* 1 P.M.

On the first day of each two-day Show, the Show will remain open until 7.30 P.M.

NOTE 3.—The following Committees meet on the first day of all Fortnightly Meetings:

Orchid Committee	11.45 A.M.
Fruit and Vegetable Committee	12 NOON
Floral Committee A	12.15 P.M.
Floral Committee B	12 NOON
Joint Rock-Garden Plant Committee	12.30 P.M.
Library Committee	3.30 P.M.
Scientific Committee	4 P.M.

As a rule, plants intended for inspection by a Committee should be entered with the Secretary of the Committee at least half an hour before the meeting.

Days and times of other meetings of Committees so far as fixed are given in the Calendar.

January		*Time.*
9	Entries for General and Teachers' Examinations close.	
10	**Fortnightly Meeting.** Flowers in season. Cypripedium Competition for Amateurs	12 NOON–5 P.M.
	Lecture (Institute of Landscape Architects) by Mr. Edward White, V.M.H., on "Landscape Design in Memorial Gardens"	3.30 P.M.

		Time.
January		
24	**Fortnightly Meeting.** Flowers in season. Special exhibit from Wisley: Winter stages of Pests and Diseases of Fruits and other Plants	12 NOON–5 P.M.
	Lecture by Mr. A. J. Cobb on "Dahlias" .	3.30 P.M.
31	Entries for British Floral Art Diploma Spring Examination close.	
February		
1	Entries for National Diploma in Horticulture Examinations close.	
7	**Fortnightly Meeting.** Flowers in season . .	12 NOON–5 P.M.
	Narcissus and Tulip Committee . .	11 A.M.
	Lecture by Mr. R. E. Hay on "Colour in Rock and Woodland Gardens"	3.30 P.M.
21	**Fortnightly Meeting.** Flowers in season . .	12 NOON–7.30 P.M.
	Narcissus and Tulip Committee . .	11 A.M.
	Joint Rhododendron Committee . .	11.15 A.M.
	ANNUAL GENERAL MEETING . . .	3 P.M.
22	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
March		
7	**Fortnightly Meeting.** Flowers in season . .	12 NOON–7.30 P.M.
	Narcissus and Tulip Committee . .	11 A.M.
	Joint Rhododendron Committee . .	11.15 A.M.
	Lecture by Mr. D. E. Horton on "Bulb Experiments"	3.30 P.M.
8	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
	*Demonstration at Wisley (weather permitting): Seed Sowing—Indoors and Outdoors . .	2–4 P.M.
9	*Second day of Demonstration	2–4 P.M.
	General Examination in Horticulture (Seniors and Juniors).	
15	*Demonstration at Wisley (weather permitting): Rose Pruning and Pruning of Shrubs . .	2–4 P.M.
16	*Second day of Demonstration	2–4 P.M.
18	Teachers' Examination in School and Cottage Gardening.	
21	**Fortnightly Meeting.** Flowers in season . .	12 NOON–7.30 P.M.
	Cymbidium Trophy Competitions for Amateurs.	
	Narcissus and Tulip Committee . .	11 A.M.
	Joint Rhododendron Committee . .	11.15 A.M.
	Lecture by Mr. Guy L. Wilson on "Daffodil Gardening"	3.30 P.M.
22	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
28	Alpine Garden Society's Show (Old Hall) and British Carnation Society's Show (New Hall)	1–7.30 P.M.
	Joint Perpetual-flowering Carnation Committee	12 NOON
	Joint Rock-Garden Plant Committee . .	12.30 P.M.
29	Second day of Alpine Garden Society's and British Carnation Society's Shows . .	10 A.M.–5 P.M.
30	British Floral Art Diploma. Written Examination.	
April		
1	London Gardens Society's Show (Old Hall) .	1–7 P.M.
4	**Fortnightly Meeting.** Flowers in season . .	12 NOON–7.30 P.M.
	Sewell Medal Competitions for Alpines and Rock-Garden Plants for Amateurs and Horticultural Traders.	

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* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

April		*Time.*
4	Narcissus and Tulip Committee	11 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Joint Iris Committee	12.45 P.M.
	Lecture by The Viscountess Byng of Vimy on "Amenable Rock Plants"	3.30 P.M.
5	**Second day of Meeting**	10 A.M.–5 P.M.
	Lecture (Institute of Landscape Architects) by Mr. R. E. Hay on "Planting from Seed in Public Parks and Gardens"	3.30 P.M.
	*Demonstration at Wisley (weather permitting): Spring Spraying of Fruit Trees	2–4 P.M.
6	Entries for Early Market Produce Show close.	
	*Second day of Demonstration	2–4 P.M.
10	Entries for Daffodil Show close.	
13 (Thurs.)	**Daffodil Show** (New Hall). (See special schedule)	1–7.30 P.M.
	Special exhibit from Wisley: The Pests and Diseases of Bulbs.	
	Early Market Produce Show (Old Hall). (See special schedule.)	1–7.30 P.M.
	Fruit and Vegetable Committee	12 NOON
	Narcissus and Tulip Committee	12 NOON
	Lecture by Mr. Ambrose Heath on "Salads and their Making"	3.30 P.M.
14	**Second day of Shows**	10 A.M.–5 P.M.
(Fri.	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
18	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Odontoglossum Competition for Amateurs.	
	National Auricula and Primula Society's Show	12 NOON–7.30 P.M.
	Narcissus and Tulip Committee	11 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Joint Iris Committee	12.45 P.M.
	First Masters Memorial Lecture by Dr. J. C. Willis, F.R.S., on "How Plants have found their Homes"	3.30 P.M.
	Lily Group Meeting in Annexe, Old Hall. Discussion on the Propagation of Lilies	4.30 P.M.
19	**Second day of Meeting**	10 A.M.–5 P.M.
	Second Masters Memorial Lecture by Dr. J. C. Willis, F.R.S., on "How Plants have found their Homes"	3.30 P.M.
25	Alpine Garden Society's Show (Old Hall)	1–7.30 P.M.
	Joint Rock-Garden Plant Committee	12.30 P.M.
26	Second day of Alpine Garden Society's Show	10 A.M.–5 P.M.
26–27	British Floral Art Diploma. Practical Examination.	
29	National Diploma in Horticulture. Written Examination.	
May		
1	Entries close for the examination for the National Certificate in Elementary Horticultural Practice.	
2	**Fortnightly Meeting** (Old Hall). Flowers in season	12 NOON–7.30 P.M.
	Sewell Medal Competitions for Alpine and Rock-Garden Plants for Amateurs and Horticultural Traders.	
	Flowering Tree and Shrub Competition for Amateurs.	
	Rhododendron Association's Show (New Hall)	1–7.30 P.M.
	Narcissus and Tulip Committee	11 A.M.
	Joint Rhododendron Committee	12.15 P.M.
	Joint Iris Committee	12.45 P.M.

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* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

		Time.
May		
2	Lecture by Mr. H. C. Green on "Town Window-Box Gardening"	3.30 P.M.
8	**Second day of Meeting** and Rhododendron Show	10 A.M.–5 P.M.
16 (Tues.)	**CHELSEA SHOW.** Royal Hospital Gardens, Chelsea, S.W. 3. (See special schedule.) Admission of Fellows by special invitation only	2–8 P.M.
	Joint Rock-Garden Plant Committee	10.30 A.M.
	Fruit and Vegetable Committee	10.30 A.M.
	Joint Iris Committee	11.15 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Narcissus and Tulip Committee	11.15 A.M.
	Orchid Committee	12.15 P.M.
	Floral Committee A	12.15 P.M.
	Floral Committee B	12.15 P.M.
17 (Wed.)	**CHELSEA SHOW.** Royal Hospital Gardens, Chelsea, S.W. 3. Private view for holders of Fellows' tickets only	8 A.M.–12 NOON
	Public admitted from noon	12 NOON–8 P.M.
18 (Thurs.)	**CHELSEA SHOW.** Royal Hospital Gardens, Chelsea, S.W. 3. Private view for holders of Fellows' tickets only	8–10 A.M.
	Public admitted from 10 A.M.	10 A.M.–8 P.M.
19 (Fri.)	**CHELSEA SHOW.** Royal Hospital Gardens, Chelsea, S.W. 3	9 A.M.–5 P.M.
June		
6	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Sewell Medal Competition for Alpines and Rock-Garden Plants for Amateurs only.	
	Iris Society's Show	1–7.30 P.M.
	Joint Delphinium Committee	11 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Joint Iris Committee	12.45 P.M.
	Iris Discussion opened by Miss L. F. Pesel speaking on "Iris Colours—Harmony and Contrast"	3.30 P.M.
7	**Second day of Meeting** and Iris Society's Show	10 A.M.–5 P.M.
	Lecture (Institute of Landscape Architects) by Mr. Christopher Tunnard on "The Modern Movement in Landscape Architecture"	3.30 P.M.
	*Demonstration at Wisley (weather permitting): Summer Pruning of Shrubs	2–4 P.M.
8	*Second day of Demonstration	2–4 P.M.
9	Teachers' Advanced Practical Examination at Wisley.	
12–16	National Diploma in Horticulture. Preliminary Practical Examinations at Wisley.	
13	Joint Delphinium Committee, if required	11 A.M.
20–23	National Diploma in Horticulture. Final Practical Examination at Wisley.	
20	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Shrub Competitions for Amateurs.	
	London and South of England Viola and Pansy Society's Show	12 NOON–7.30 P.M.
	Cactus and Succulent Society's Show (Old Hall)	12 NOON–7.30 P.M.
	Joint Delphinium Committee	11 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Joint Iris Committee	12.45 P.M.
	Lecture by Sir Arthur Hill, K.C.M.G., F.R.S., V.M.H., on "Pelargoniums"	3.30 P.M.
	Lily Group Meeting in Restaurant, Old Hall. Question and Answer Meeting	4.30 P.M.

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* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

		Time.
June		
21	**Second day of Meeting,** and Kindred Societies' Shows	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
23	British Delphinium Society's Show (New Hall)	1–7 30 P.M.
	National Sweet Pea Society's Show (Old Hall)	1–7.30 P.M.
	Joint Delphinium Committee	12.15 P.M.
July		
1	Lily Group Visit to the Garden of Mr. W. Hutchinson at Finchampstead and to the Nurseries of Messrs. W. A. Constable, Ltd., at Burnham.	
4	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Lily Competitions for Amateurs.	
	Joint Delphinium Committee	11 A.M.
	Joint Rhododendron Committee	11.15 A.M.
	Joint Border Carnation Committee	11.30 A.M.
	Joint Iris Committee	12.45 P.M.
	Lily Group Discussion on the Lilies exhibited (Lecture Room, New Hall)	3.30 P.M.
	Lily Group Dinner (Restaurant, New Hall), followed by a discussion	7 P.M.
5	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
11	Joint Delphinium Committee, if required	11 A.M
	Joint Border Carnation Committee	11.30 A.M.
18	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Lily Competitions for Amateurs.	
	Clay Cup Competition for new Scented Rose for Amateurs and Horticultural Traders.	
	National Carnation and Picotee Society's Show (Old Hall)	1–7.30 P.M.
	Joint Delphinium Committee	11 A M.
	Joint Iris Committee	12 45 P.M.
	Joint Border Carnation Committee	3 P.M.
	Lecture by Mr. A A. Fincham on " Fuchsias "	3 30 P M.
19	**Second day of Meeting** and National Carnation and Picotee Society's Show	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
	*Demonstration at Wisley (weather permitting): Summer Pruning of Fruit Trees	2–4 P.M.
20	*Second day of Demonstration	2–4 P.M.
25	Joint Border Carnation Committee	11.30 A.M.
August		
1	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Talk on some plants in the Show (Lecture Room)	3 30 P.M.
2	**Second day of Meeting**	10 A M.–5 P.M.
15	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Foremarke Cup and other Gladiolus Competitions for Amateurs and Horticultural Traders.	
	Joint Early-flowering Chrysanthemum Committee	11 A.M.
	Joint Dahlia Committee	11 A.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
16	**Second day of Meeting**	10 A.M.–5 P.M.
23	*Demonstration at Wisley (weather permitting): Vegetative Propagation of Plants	2–4 P.M.
24	*Second day of Demonstration	2–4 P.M.
29	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Alpine Garden Society's Show (Old Hall)	1–7.30 P.M.
	Joint Early-flowering Chrysanthemum Committee	11 A.M.

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* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

		Time.
August		
29	Joint Dahlia Committee	11 A.M.
	Joint Rock-Garden Plant Committee	12.30 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
30	**Second day of Meeting** and Alpine-Garden Show	10 A.M.–5 P.M.
September		
5	National Dahlia Society's Show (New Hall)	1–7.30 P.M.
	Joint Dahlia Committee	12.15 P.M.
6	Second day of National Dahlia Society's Show	10 A.M.–5 P.M.
8	London Gardens Society's Show (New Hall)	2.30–9 P.M.
9	Second day of London Gardens Society's Show	10 A.M.–6.30 P.M.
12	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Competition for Cacti and Succulents.	
	Joint Early-flowering Chrysanthemum Committee	11 A.M.
	Joint Dahlia Committee	11 A.M.
	Lecture by Mr. G. C. Taylor on "The Modern Garden"	3.30 P.M.
13	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
19	National Chrysanthemum Society's Show (Early-flowering)	1–7.30 P.M.
	Joint Early-flowering Chrysanthemum Committee	11 A.M.
20	Second day of National Chrysanthemum Society's Show (Early-flowering)	10 A.M.–5 P.M.
20–21	Provisional date for British Floral Art Diploma Autumn Examination.	
26	**Fortnightly Meeting.** Flowers in season	12 NOON–7.30 P.M.
	Joint Early-flowering Chrysanthemum Committee	11 A.M.
	Joint Dahlia Committee	11 A.M.
	Lecture by Mr. E. R. Janes on "Sweet Peas"	3 30 P.M.
27	**Second day of Meeting**	10 A.M.–5 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
October		
4	Entries for Fruit and Vegetable Show close.	
10	**Fortnightly Meeting** (New Hall)	12 NOON–7.30 P.M.
	Fruit and Vegetable Show (Old Hall). (See special schedule.) Special exhibit from Wisley: Pests and Diseases of Fruits and Vegetables	1–7.30 P.M.
	Joint Dahlia Committee	11 A.M.
	Lecture by Mr. F. Streeter on "The Timing of Vegetable Crops"	3.30 P.M.
11	**Second day of Meeting and Show**	10 A.M.–4 P.M.
	Talk on some plants in the Show (Lecture Room)	3.30 P.M.
24	**Fortnightly Meeting.** Orchids, Stove and Greenhouse Plants and Berried Shrubs	12 NOON–7.30 P.M.
	Orchid Cup and Trophy Competitions for Amateurs.	
	British Carnation Society's Show (Old Hall)	1–7.30 P.M.
	Joint Perpetual-flowering Carnation Committee	12 NOON
	Lecture by Mr. E. K. Balls on "Plant Hunting in Mexico"	3.30 P.M.
	Lily Group Meeting in Restaurant (Old Hall). Discussion on Plants to associate with Lilies	4.30 P.M.
25	**Second day of Meeting**	10 A.M.–4 P.M.
	Institute of Landscape Architects: Presidential Address	3 P.M.
	Second day of British Carnation Society's Show	10 A.M.–5 P.M.

November		*Time.*
2	National Chrysanthemum Society's Show (New Hall). (Fellows and Associates will be admitted to this Show on presentation of their tickets by payment of 1*s*.)	1–7.30 P.M.
3	Second day of National Chrysanthemum Society's Show	10 A.M.–5 P.M.
7	**Fortnightly Meeting.** Flowers in season . .	12 NOON–5 P.M.
	Flower Arrangement Competition for Amateurs.	
	Lecture by Mr. G. Fox Wilson, F.L.S., on "The Stem Eelworm and its relation to garden plants"	3 30 P.M.
8	*Demonstration at Wisley (weather permitting): Planting Fruit Trees and Roses . . .	2–4 P.M.
9	*Second day of Demonstration	2–4 P.M.
14–18	**IMPERIAL FRUIT SHOW** (New Hall) . .	11 A.M.–9 P.M
28	**Fortnightly Meeting.** Flowers in season (New Hall)	12 NOON–5 P.M.
	Lecture by Captain F. Kingdon Ward, V.M.H., on his recent expedition	3 30 P.M.
December		
6	*Demonstration at Wisley (weather permitting): Pruning of Fruit Trees	2–4 P.M.
7	*Second day of Demonstration	2–4 P.M.
12	**Fortnightly Meeting.** Flowers in season . .	12 NOON–5 P.M.
1940		
January		
9	**Fortnightly Meeting.** Flowers in season . .	12 NOON–5 P.M.
23	**Fortnightly Meeting.** Flowers in season . .	12 NOON–5 P.M.

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* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

PATRONS, 1938.

THEIR MOST GRACIOUS MAJESTIES THE KING AND QUEEN.
HER MOST GRACIOUS MAJESTY QUEEN MARY.
H.R.H. THE PRINCESS ROYAL.
H.R.H. THE DUKE OF CONNAUGHT.

COUNCIL AND OFFICERS, 1938–9.

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* Elected annually at Annual General Meeting.
† Resigned Treasurership during year of office, 1938.
‡ Retire at Annual General Meeting, 1939.

THE SOCIETY AND ITS WORK.

THE purpose of the Society is to encourage and improve the science and practice of horticulture in all its branches. It consists of Fellows, Associates, Honorary Fellows and Associates of Honour, numbering in all over 36,500, and over 700 Horticultural Societies are affiliated to it.

It is governed by a President and Council of fifteen members, of whom one-fifth retire annually in February, when the election of President, Vice-Presidents, Treasurer, and three new members of Council takes place.

The Society was founded at a meeting held on March 7, 1804, at Hatchard's book-shop in Piccadilly—a fact commemorated by a bronze plaque placed upon the house. Mr. JOHN WEDGWOOD was in the Chair, and there were also present the Right Hon. CHARLES GREVILLE, the Right Hon. Sir JOSEPH BANKS, P.R.S., WILLIAM TOWNSEND AITON, RICHARD ANTHONY SALISBURY, WILLIAM FORSYTH, and J. DICKSON. These gentlemen formed the nucleus of the Horticultural Society of London, and the avowed duty of the Society was " to collect every information respecting the cultivation of all plants and trees " and " to foster and encourage every branch of horticulture."

The meetings of the Society were first held in the rooms of the Linnean Society, then in Regent Street, and for many years they took place at 21 Regent Street ; then for a few months at St. Martin's Place, Trafalgar Square, whence they were transferred under the Presidency of H.R.H. the PRINCE CONSORT to premises of some magnificence at South Kensington, on land now partly occupied by the Imperial Institute.

These premises finally proved too expensive to maintain, and for this and other reasons the Society's offices were removed in 1883 to rooms in Victoria Street, and the meetings took place in the London Scottish Drill Hall, Buckingham Gate, S.W., until 1904, when the Hall and Offices in Vincent Square, built by subscription to commemorate the Society's Centenary, were opened by His Majesty King EDWARD VII. From 1888 under the Presidency of Sir TREVOR LAWRENCE, Bt., and the Secretaryship of the Rev. WILLIAM WILKS, M.A., the story of the Society had been one of progress. This progress continued after the opening of the Hall until the accommodation both for offices and meetings had been outgrown, and in 1928 the New Hall in Greycoat Street was opened by H.R.H. Princess MARY, and the offices in Vincent Square were rearranged and a fine new Library was constructed on the top floor.

The Society was incorporated by Royal Charter, granted on April 7, 1809, and in 1861, on its move to South Kensington, a new Charter was granted to it under the style and title of the Royal Horticultural Society. A supplementary Charter was granted in 1899, and as the Society had continued to increase beyond expectations a new Charter was granted in 1928, coincident with the opening of the New Hall.

FELLOWSHIP OF THE SOCIETY.

Anyone interested in horticulture is eligible for Fellowship and is invited to become a Fellow. Candidates for Fellowship must be nominated on a special form, a copy of which can be obtained from the Secretary, and the nomination form must be signed by a Fellow. Privileges of Fellowship, which include admission to all meetings and to the Society's Gardens at Wisley, the use of the Library, a copy of the JOURNAL, etc., are set out on the Nomination Form. The entry fee is at present in abeyance. The annual subscription is from one to four guineas.

ASSOCIATES OF THE SOCIETY.

Candidates for election as Associates must be *bona fide* employed in horticulture, and must be nominated by two Fellows. Associates pay 10*s*. 6*d*. per annum.

HONORARY FELLOWS AND ASSOCIATES OF HONOUR

are appointed by the Council.

HONORARY FELLOWS.

AUCHTER, Prof. E. C., U.S. Department of Agriculture, Bureau of Plant Industry, Washington, D.C., U.S.A.

BAILEY, Prof. L. H., LL.D., Litt.D., Dean Emeritus, Bailey Hortorium, Ithaca, New York, U.S.A.

BAKER, F. J., A.R.C.S., Fisherswood, Sharnall Street, Hoo, Rochester, Kent.

BARKER, Prof. B. T. P., M.A., University of Bristol Research Station, Long Ashton, Bristol.

BEAN, W. J., C.V.O., I.S.O., V.M.H., 2 Mortlake Road, Kew, Surrey.

BLACKMAN, Prof. V. H., M.A., Sc.D., F.R.S., 17 Berkeley Place, S W. 19.

BØRGESEN, Dr. F. C. E., Botaniske Museum, Gothersgade 130, Copenhagen K, Denmark.

BOIS, Prof. D. G. J. M., 68 Boulevard Soult, Paris XIIe, France.

CALDER, C. C., B.Sc., B.Sc. (Agr.), F.L.S., Director, Botanical Survey of India, Royal Botanic Garden, Sibpur, nr. Calcutta, India.

CALVINO, Dr. MARIO, Director of the Stazione Sperimentale di Floricultura, San Remo, Italy.

CARPENTER, Prof. G., B.Sc., Rotherwood, St. Catherine's Estate, Broxbourne, Herts.

CARR, Emeritus Prof. the Rev. J. W., M.A., F.L.S., F.G.S., 107 St. Helen's Road, Hastings, Sussex.

COLLINGE, Dr. W. E., F.S.A., The Yorkshire Museum, York.

COMPTON, Prof. R. H., M.A., F.R.S. (S. Af.), Director, National Botanic Gardens of S. Africa, Kirstenbosch, Newlands, Cape Town, S. Africa.

CORREVON, Dr. H., Jardin d'Acclimatation, Geneva, Switzerland.

COTTON, A. D., O.B.E., F.L.S., The Herbarium, Royal Botanic Gardens, Kew, Surrey.

DE WILDEMAN, Prof. E., 122 rue des Confédérés, Brussels, Belgium.

DIELS, Prof. Dr. L., Director, Botanischer Garten u. botanisches Museum, Berlin-Dahlem, Germany.

Ebblewhite, E. A., LL.D., J.P., F.S.A., 5 Essex Court, E.C. 4.

Fedtschenko, Prof. Boris, Jardin Botanique Principal, Leningrad, U.S.S.R.

Fries, Prof. K. R. E., Ph.D., F.M.L.S., Director, Bergianska Trädgården, Stockholm, Sweden.

Gentil, Louis, 35 Avenue de l'Arbalète, Boitsfort, Belgium.

Gibault, Georges, 84 rue de Grenelle, Paris, France.

Gussow, H. T., LL.D., F.L.S., F.R.S. (Can.), Dominion Botanist, Central Experimental Farm, Ottawa, Canada.

Hall, Rev. J. Bernard, M.A., Preston Rectory, Lavenham, Suffolk.

Handel-Mazzetti, Dr. H., Custos an der Botanischen, Abteilung des Naturhistorischen Museum, Vienna, Austria.

Hennesey, Eugene E., B.A., B.Sc., High Mead, Kanes Hill, West End, Southampton.

Hoog, J. M. C., 86 Koninginneweg, Haarlem, Holland.

Hoyt, Mrs. A. Sherman, Hillcrest, Buena Vista Av., S. Pasadena, California.

Izquierdo, Salvador, Moneda 778, Santiago, Chile.

Krelage, Ernst H., 6 Stolbergstraat, Haarlem, Holland.

Krichauff, The Hon. Frederick, Agricultural Bureau, Adelaide, S. Australia.

Lemperg, Dr. F., Hatzendorf, Steiermark, Austria.

Lockie, George, Botanic Gardens King William's Town, S. Africa.

Merrill, Dr. E. D., F.M.L.S., Gray Herbarium, Cambridge, Mass., U.S.A.

Moore, Sir Frederick W., M.A., F.L.S., V.M.H., Rathfarnham, Co. Dublin.

Newstead, Emeritus Prof. R., M.Sc., F.R.S., A.L.S., F.R.E.S., St. Mary's Cottage, 67 Handbridge, Chester.

Pole-Evans, Dr. I. B., C.M.G., M.A., F.L.S., Irene, Transvaal, S. Africa.

Potter, Rev. M. C., M.A., Sc.D., F.L.S., Corley Croft, New Milton, Hants.

Prain, Lt.-Col. Sir David, C.M.G., C.I.E., LL.D., F.R.S., F.L.S., V.M.H., The Well Farm, Warlingham, Surrey.

Ramsbottom, J., O B E., M.A., Dr.Sc., Pres.L.S., British Museum (Natural History), Cromwell Road, S.W. 7.

Rehder, A., A.M., Curator of the Herbarium, Arnold Arboretum, Harvard University, Jamaica Plain, Mass., U.S.A.

Salmon, Prof. Ernest S., F.L.S., South-Eastern Agricultural College, Wye, nr. Ashford, Kent.

Schneider, Dr. C. K., Bolivarallee 9, Berlin-Charlottenburg 9, Germany.

Sirks, Dr. M. J., Genetisch Institut, c/o Botanisch Laboratorium, Rozenstraat, Groningen, Holland.

Skottsberg, Prof. C. J. F., Göteborgs Botaniska Trädgård, Sweden.

Stout, Dr. A. B., Director of the Laboratories, New York Botanical Garden, Bronx Park (Fordham Branch P.O.), New York, N.Y., U.S.A.

Tanaka, Prof. Tyozaburo, Taihoku Imperial University, Taiwan, Japan.

Tets van Goidschalxoord, Jonkheer G. F. van, Huize 't Valckenbosch, Zeist, Holland.

The Master of the Worshipful Company of Fruiterers, c/o The Clerk of the Company.

The Master of the Worshipful Company of Gardeners, c/o The Clerk of the Company.

Tschermak-Seysenegg, Prof. Dr. Erich, Hochschule für Bodenkultur, Vienna, Austria.

Van Slogteren, Prof. Dr. Egbertus, Laboratorium voor Bloembollenonderzoek, Lisse, Holland.

Vanwijngaerden, A., Directeur de l'Ecole d'Horticulture de l'Etat, Vilvorde, Belgium.

Vavilov, Prof. Dr. N. I., Director of the Institute of Plant Industry, 44 Rue Herzen, Leningrad, U.S S.R.

Vollbracht, Adolf, Austrian Hort. Society, 12 Parkring, Vienna, Austria.

Waller, Ernest, Emsallah, Tangier, Morocco.

Worsdell, W. Crosfield, 11 Westbourne House, Twickenham, Middlesex.

Worsley, A., J.P., The Cliff, 3 Bath Road, Ventnor, I. of W.

Zawodny, M. le Docteur Joseph, 105 Moldantein, Czechoslovakia.

ASSOCIATES OF HONOUR.

Established in 1930 and conferred on Persons of British nationality who have rendered distinguished service to Horticulture in the course of their employment. The number of Associates of Honour may not exceed 100 at any one time.

1933 Alexander, John, Niddrie Gardens, Craigmillar, near Edinburgh.
1933 Allan, Donald, c/o Dobbie's Seed Farms, Marks Tey, Essex.
1931 Anderson, T. W., c/o Laxton Bros., 63 High Street, Bedford.
1930 Ashmore, A. J., 10 Desenfans Road, Dulwich, S.E. 21.
1936 Bailey, Wm. H., Eastfield, Waverley Lane, Farnham, Surrey.
1932 Baker, W. G., Botanic Garden, Oxford.
1930 Banks, G. H., Glasgow Botanic Gardens, Glasgow.
1934 Barron, F. S., Westholme, Colville Road, Wisbech, Cambs.
1933 Beatty, T., 175 Myland Road, Colchester.
1930 Benbow, J , Wyke House Hotel, Weymouth.
1930 Bennett, W., 12, Dewley Road, Slatyford, Westerhope, Newcastle-on-Tyne.
1931 Besant, J. W., Botanic Gardens, Glasnevin, Dublin, N.W. 3.
1931 Blair, C., 5 Royal Terrace, Linlithgow, Scotland.
1938 Blakey, Wm. J., R.H.S. Gardens, Wisley, Ripley, Surrey.
1930 Bliss, D., V.M.H., Parks Department, Guildhall, Swansea, Glam.
1936 Bolas, T. Wm., The Gardens, Mount Stewart, Newtownards, Co. Down.
1937 Brace, Josh, c/o Thomas Rivers & Son, The Nurseries, Sawbridgeworth, Herts.
1934 Braggins, S. W. Macleod, Villa Crosa, Via Cuggiola, Strada Romana, Bordighera, Italy.
1931 Brew, E. U., c/o Charlesworth & Co., Ltd., Orchid Growers, Haywards Heath, Sussex.
1930 Brown, T. W., Ministry of Agriculture, Horticultural Section, Giza (Mudiriya), Egypt.
1938 Buckman, J., The Gardens, Highdown, Goring-by-Sea, Sussex.
1931 Bullock, A., 158 Northwood Way, Northwood Hills, Middlesex.
1934 Burton, Miss M. E., Glen View, Lasswade, Midlothian.
1937 Campbell, D., New Lodge, Inner Circle, Regent's Park, N.W. 1.
1932 Chisholm, J. S., Edinburgh & East of Scotland College of Agriculture, 13 George Square, Edinburgh.
1933 Christie, J. S., 424 Lordship Lane, E. Dulwich, S.E. 22.
1931 Coates, A. W., The Gardens, Wakehurst Place, Ardingly, Sussex.
1930 Comber, J., V.M.H., The Gardens, Nymans, Handcross, Sussex.
1931 Cook, C. H., The Royal Gardens, Sandringham, King's Lynn, Norfolk.
1930 Cook, T. H., Bewdley, South Wootton, King's Lynn, Norfolk.
1930 Cooper, E. W., 2 North Riding, Bricket Wood, St. Albans, Herts.
1930 Coutts, J., M.B.E., V.M.H., Lasswade, Green Meads, Westfield, Woking, Surrey.
1932 Craven, William, Mowbray House, Radipole Park Drive, Weymouth, Dorset.
1931 Davidson, J. J., The Gardens, Ardencraig, Rothesay, Bute.
1938 Elphick, H. G., 6 Benhall Mill Road, Tunbridge Wells.
1932 Gibson, E., 19 Helix Road, Brixton Hill, S.W. 2.
1930 Giles, W. F., 38 Redlands Road, Reading, Berks.
1930 Guttridge, J. J., Burwood, Woodlands Road, Aigburth, Liverpool, 17.
1934 Harrison, A. T., The Gardens, Training Centre, Jordanhill, Glasgow, W. 3.
1930 Harrow, G., Gracefield, 27 Tudor Road, Kingston Hill.
1930 Hill, John, The Gardens, Duntreath Castle, Blanefield, Stirlingshire.
1930 Holton, R. H., c/o J. Cheal & Sons, Ltd., The Nurseries, Crawley, Sussex.
1932 Horwood, Frederick, M.M., Hillside, Picts Hill, Langport, Somerset.
1930 Isbell, W., 16 St. Mark's Road, Bush Hill Park, Enfield.
1934 Janes, E. R., 12 Brooklyn Drive, Emmer Green, Reading.
1931 Jeary, T. J. P., c/o George Monro, Ltd., 41 King Street, Covent Garden, W.C. 2.
1930 Jenkins, W. A., Faceby, Stokesley, Yorks.
1938 Johnson, G. F., Waddesdon Gardens, Aylesbury, Bucks.
1930 Jordan, F., V.M.H., Yewdene, Edenbridge, Kent.
1930 Kettlety, A., c/o Blackmore & Langdon, Twerton Hill Nursery, Bath.
1930 Logan, W., St. Blaise, 8 Holtwhite Avenue, Enfield, Middlesex.
1931 Long, E. P., 1 Empire Road, Bemerton, Salisbury, Wilts.
1932 Long, F. R., Superintendent of Public Parks, St. George's Park, Port Elizabeth, Cape Province, Africa.
1931 McDonald, F. W., 172 London Road, Reading.
1932 McInnes, Donald, The Gardens, Glamis Castle, Glamis, Angus, Scotland.
1931 McIntosh, D. F., c/o R. H. Bath, Ltd., Floral Farms, Wisbech, Cambs.

1930 McLaren, J., Superintendent, Golden Gate Park, San Francisco, California.
1931 Macrae, A., Nairnside, Lintrathen Gardens, Dundee.
1931 Maitland, T. D., M.B.E., 20 Craiglockhart Terrace, Edinburgh.
1932 Markham, H., The Gardens, Wrotham Park, Barnet, Herts.
1930 Marlow, W. J., 205 Richmond Road, Kingston-on-Thames, Surrey.
1931 Mathews, J. W., Creekside, Orange Street, Fernwood, Claremont, Cape Town, S. Africa.
1930 Metcalfe, A. W., Rozel, Hatfield Road, St. Albans, Herts.
1937 Middleton, C. H., 17 Prince's Avenue, Surbiton, Surrey.
1935 Moore, H. J., Box 61, Islington, Ontario, Canada.
1930 Mudge, E. C., c/o Barr & Sons, 11/13 King Street, Covent Garden, W.C.
1933 Mustoe, W. R., O.B.E., 70 Stag Leys, Ashtead, Surrey.
1930 Neal, E., The Gardens, Tilgate, Crawley, Sussex.
1934 Nobbs, G., Brandon, Old Road, E. Cowes, I. of W.
1930 Oliver, W., 20 Slitrig Crescent, Hawick.
1930 Page, W. H., The Gardens, Chardwar, Bourton-on-the-Water, Glos.
1933 Perfect, B. F., Gatton Park Gardens, Reigate, Surrey.
1936 Preston, F. G., V.M.H., University Botanic Garden, Cambridge.
1938 Prior, J., c/o D. Stewart & Son Ltd., Ferndown Nurseries, Wimborne, Dorset.
1931 Pritchard, W. J., Marsden Avenue, New Queniborough, nr. Leicester.
1930 Puddle, F. C., V.M.H., The Gardens, Bodnant, Tal-y-Cafn, Denbighshire.
1933 Radley, S., c/o R. Veitch & Son, Ltd., The Royal Nurseries, Alphington, Exeter.
1934 Raffill, C. P., 197 Kew Road, Kew, Surrey.
1930 Rogers, J., 80 Lichfield Road, Sutton Coldfield, Warwick.
1937 Rose, F. J., Townhill Park Gardens, West End, Southampton.
1930 Shill, J. E., Westover, Ashford Road, Laleham-on-Thames, Middlesex.
1938 Sillars, R. K., 33 London Road, Kilmarnock, Ayrshire.
1930 Sillitoe, F. S., M.B.E., 31 Priory Road, Kew, Surrey.
1933 Smith, Samuel, Quay Road, St. Germans, Saltash, Cornwall.
1930 Street, C., The Gardens, Floors Castle, Kelso, Roxburghshire.
1930 Tannock, D., Superintendent, Reserves Department, Botanic Gardens, Dunedin, New Zealand.
1932 Taylor, George, The Gardens, Bulstrode, Gerrard's Cross, Bucks.
1932 Taylor, George M., Links Cottage, Longniddry, East Lothian.
1932 Troughton, Francis, 1 Vernon Park, St. John's, Worcester.
1933 Tucker, S. W., The Gardens, Longford Castle, Salisbury, Wilts.
1935 Tustin, F., The Gardens, Abbotswood, Stow-on-the-Wold, Glos.
1934 Usher, A. E., Ranston Gardens, Blandford, Dorset.
1936 Wadds, A. B., Pansy Dene, Calcot, Reading.
1930 Webster, C., The Gardens, Gordon Castle, Fochabers, Elginshire.
1930 Weston, J. G., Chatsworth Gardens, Bakewell, Derbyshire.
1931 Williams, R. O., Beit Cattan, Katamon Road, Jerusalem, Palestine.
1932 Wood, C. F., Park Lodge, Slaugham Park, Handcross, Sussex.
1930 Woodward, J. G., The Gardens, Barham Court, Teston, Maidstone.
1935 Wort, J., 4 Lidyard Road, Archway Road, N. 19.

FORMER ASSOCIATES OF HONOUR.

1931 Andrews, A. (d. 1937).
1930 Bedford, A. (d. 1934).
1931 Blair, P. C. (d. 1936).
1930 Brown, J. (d. 1930).
1930 Buss, F. (d. 1930).
1931 Cameron, J. (d. 1935).
1930 Carpenter, G. (d. 1935).
1933 Clark, W. B. (d. 1938).
1934 Gingell, W. B. (d. 1936).
1932 Hales, W. (d. 1937).
1931 Hoare, J. (d. 1932).
1930 Honess, W. H. (d. 1937).
1931 Hosking, A. (d. 1938).
1930 Howe, W. (d. 1930).
1932 Ingram, G. J. (d. 1935).
1930 Irving, W. (d. 1934).
1930 Johnson, W. E. (d. 1937).
1931 Jones, J., O.B.E. (d. 1934).
1932 Jones, J. (d. 1933).
1931 Lane, G. T. (d. 1936).
1931 Macdonald, J. V. (d. 1936).
1930 Macfie, J. B. (d. 1938).
1932 Mann, P. (d. 1937).
1932 Markham, E. (d. 1937).
1931 Pateman, T. (d. 1933).
1930 Scott, J. W. (d. 1938).
1930 Stewart, L. B. (d. 1934).
1938 Stewart, W. (d. 1938).
1931 Taylor, T. W. (d. 1932).
1932 Vasey, A. E. (d. 1934).
1930 Wakely, C. (d. 1932).

AFFILIATED SOCIETIES.

Any horticultural, allotment, or cottage garden Society may become affiliated to the Royal Horticultural Society on payment of a subscription of one or two guineas. The privileges, among others, include two transferable tickets of admission to all the meetings in the Society's Halls announced in the Calendar and to the Society's

Gardens at Wisley, a number of special tickets for the Great Spring Show in accordance with the affiliation subscription, two copies of the Society's JOURNAL as issued, and a copy of the Society's Rules for Judging, the right to purchase at a discount many of the Society's publications, and at cost price the Affiliated Society's Medal and Medal Cards, to apply for a grant of a Banksian Medal and Card, etc., etc.

Fellows are asked to bring to the notice of local Secretaries the great privileges conferred by affiliation ; full particulars, together with an application form, can be obtained by applying to the Secretary.

MEETINGS. (See Calendar, pp. 1–7.)

A meeting and exhibition are held usually at fortnightly intervals in the New Hall in Greycoat Street, Westminster, and sometimes the Old Hall in Vincent Square is occupied as well.

There are also special meetings for the Daffodil Show, the Early Market Produce Show, the Great Spring Show at Chelsea, and the Fruit and Vegetable Show.

The times during which the Shows are open are shown in the Calendar, and Fellows are particularly asked to note that, in order to meet the convenience of Fellows who find it difficult to visit the Shows, the two-day Shows have been arranged to commence at the Annual Meeting in February and end at the last meeting in October. The Shows will be open from 12 noon to 7.30 P.M. on the first day, and 10 A.M. to 5 P.M. on the second.

At these meetings there are exhibitions of Flowers, Fruits and Vegetables, to which all horticulturists are invited to contribute. The arrangements for showing are briefly set out in the section dealing with the Committees and their work (pp. 38–61), and at all these meetings Committees appointed for the purpose make recommendations for Awards (p. 30) to the plants before them.

Sundries of a horticultural nature are exhibited at the meetings in December and January, and if space permits on November 28, and at the Great Spring Show ; Pictures of Plants, Flowers, and Gardens and Models and Plans of Gardens are also admitted to the Shows in November, December, January and the first meeting in February.

LECTURES AND TALKS.

Lectures on subjects of horticultural interest are given at the Fortnightly Meetings, at 3.30 P.M., in the Lecture Room.

Arrangements are being made to hold informal talks and discussions on some of the plants exhibited at 3.30 P.M. in the Lecture Room on the second day of most two-day Shows (on the first day of the August fortnightly Shows).

In addition, discussions have been arranged for those specially interested in Lilies and their allies (see pp. 3–6, 15).

CONFERENCE ON RHODODENDRONS IN 1940.

A Conference on Rhododendrons under the auspices of this Society and the Rhododendron Association will be held in 1940, when a number of interesting papers on the cultivation and use of Rhododendrons in the garden, on their propagation and on the species and their distribution, etc., will be read, followed by discussions.

In conjunction with the Conference there will be a Show and visits to gardens. Further particulars will be announced in due course in the JOURNAL.

LILY GROUP.

The Lily Group consists of Fellows and Associates of the Royal Horticultural Society who are especially interested in Lilies, Nomocharis and Fritillaries. Its object is to provide Members with facilities for meeting to exchange views upon these plants. Membership is open to all Fellows and Associates without additional subscription. Those who wish to join should apply in writing to the Secretary, who notifies Members by post of all meetings. Upon the recommendation of the Lily Committee the Council has arranged five meetings for 1939. The dates and subjects to be discussed will be found in the Calendar. Each discussion will be introduced by one or more speakers who have made a special study of the subject, and thereafter the discussion will be open. All Members are cordially invited to take part, and to bring plants, cut blooms, photographs or lantern slides bearing upon the subject under discussion. Inquiries from beginners will be welcomed.

COMPETITIVE CLASSES FOR AMATEURS.

Competitive classes for amateurs will be held at the following Meetings during the year 1939 (see also back of the tickets admitting to the Society's Shows):

January 10, for Cypripediums.
March 21 and 22, for Cymbidiums.
April 4 and 5, for Alpine plants.
April 13 and 14, for Daffodils.
April 18 and 19, for Odontoglossums.
May 2 and 3, for Flowering Trees and Shrubs and Alpine plants.
June 6 and 7, for Alpine plants.
June 20 and 21, for Flowering Shrubs.
July 4 and 5 and 18 and 19, for Lilies.
August 15 and 16, for Gladioli.
September 12 and 13, for Cacti and other succulent plants.
October 10 and 11, for Fruit and Vegetables.
October 24 and 25, for Orchids.
November 7, for Flower Arrangements.

Full particulars and entry forms may be obtained from the Secretary.

THE LINDLEY LIBRARY.

Trustees: The Society acting by its Council.
Keeper: F. J. CHITTENDEN, F.L.S., V.M.H.
Asst. Librarian: W. T. STEARN, F.L.S.

This Library now consists of about 20,000 volumes and pamphlets, the latter being very important, and is registered as an "Outlier Library" of the Central Library for Students (see regulation 11).

The nucleus of the Library is the fine collection of books and pamphlets formed by the late Dr. LINDLEY, so long and so honourably associated with the Society. Large additions have been received and are constantly being made by donations and by purchases by the Society, the largest in recent years being the very important collection of books and illustrations bequeathed by the late Mr. REGINALD CORY.

The original fittings and furnishings of the old Library, the generous gift of the late Sir HENRY SCHRÖDER, were removed from the old and re-erected in the new Library on the third floor of the Offices of the Society in Vincent Square, and the cost of equipment of the stack room was presented by the Trustees of the Carnegie United Kingdom Trust Fund.

The Council confidently asks the assistance of the Fellows and of the general public in its endeavours to supplement the Library. Donations of money, and of horticultural and botanical books and horticultural trade catalogues are earnestly solicited, and may be sent to the Secretary, R.H.S., Vincent Square, S.W. 1.

LIBRARY REGULATIONS.

1. The Library is open daily (Sundays and holidays excepted) from 10 A.M. to 5 P.M. (Saturdays 10 A.M. to 1 P.M.). On two-day Shows at Westminster, it will be open until 6 o'clock on the first day of the Show.

2. The right of closing the Library at any time for purposes of re-arrangement, cleaning, etc., is reserved. It will be closed annually for a fortnight after the second fortnightly meeting of the Society in July, in order that the books may be cleaned and the stock inspected. For this purpose it is absolutely necessary that all books borrowed be returned on or before July 20. During the two weeks which follow Fellows will be able to consult books but not to borrow them.

3. Fellows of the Society have access to the Library at all times when it is open.

4. Gardeners and others, not Fellows or Officers of the Society, must make application to the Secretary for permission to use the Library, and must enter their names and addresses in a book provided for that purpose.

5. Anyone requiring the loan of a book to be taken from the Library must make written application to the Secretary, and loans will be granted on the following conditions, viz.:—

(*a*) That the borrower be personally known to one or more of the Officers of the Society, or produce satisfactory references.
(*b*) That the borrower sign the receipt for the volumes in a book provided for the purpose, before removing them from the premises, or if unable to attend, acknowledge the receipt by post; and undertake to restore the books in good condition and to comply with the regulations.
(*c*) That not more than three volumes be lent to one person at one time.
(*d*) That borrowers through the post pay the postage both ways.

6. A certain discretion will be used as to what books shall be lent, but rare books which it would be difficult to replace, periodicals, expensive illustrated works and works of reference which are likely to be in frequent requisition within the Library itself may not be removed from the premises.

7. No books may be sent to Fellows resident abroad.

8. All books borrowed must be returned to the Library in good condition within one calendar month from the date of issue, and if sent by post must be properly protected and packed, but an extension of time may be granted on application.

9. The Secretary is empowered to demand of the borrowers such books as are retained beyond the prescribed time, and to take such steps as may be necessary to secure the prompt return of the same.

10. The loss of any book or any damage must be made good by the borrower.

11. Fellows requiring books on loan from the "Outlier" Libraries should make written application either to the Secretary of the Society or to the National Central Library for Students, Malet Place, London, W.C. 1.

12. The Trustees reserve the right of repealing or altering any of these regulations from time to time as may be required.

PRIVILEGES OF CHEMICAL ANALYSIS.

Analyses of soils, manures, water, etc., are made at a reduced rate for Fellows who are not engaged in any horticultural trade or in the manufacture or sale of any substance sent for analysis, and for Affiliated Societies. Full particulars of fees, methods of sampling, etc., can be obtained of the Secretary.

PUBLICATIONS.

The Society's publications include the JOURNAL, now issued to all Fellows monthly, containing an account of the Society's activities, lectures delivered at the fortnightly meetings, articles on horticultural matters specially contributed, descriptions and notes on plants to which awards have been made, accounts of work at Wisley, etc.

CURTIS'S BOTANICAL MAGAZINE, publication of which began in 1787, containing hand-coloured illustrations, descriptions and notes on new plants or plants recently introduced to gardens from abroad, published quarterly, price £3 3*s.* per annum.

The INDEX LONDINENSIS, an index of all illustrations of flowering plants and ferns published between 1753 and 1921, in six volumes, price £5 5*s.* a volume. A supplement up to the end of 1935 is in preparation.

An Index to the Society's JOURNAL from 1838 to 1935, with List of Awards 1859–1935, price 20*s.* in paper, and 21*s.* in buckram.

The LILY YEAR BOOK, price 5*s.* in paper, 6*s.* in cloth, is published annually in autumn, and the DAFFODIL YEAR BOOK, price 5*s.* in paper, 6*s.* in cloth, appears in summer. "SOME GOOD GARDEN PLANTS," containing descriptions and notes of plants which have received the Award of Garden Merit, which was published in January 1938, has proved very popular and has now been reprinted.

Reports of the Society's Conferences (the latest being Flowering Trees and Shrubs, published in 1938) are also published from time to time, as well as numerous Pamphlets, Books and Lists.

A full list of the Society's publications can be obtained on application to the Secretary.

FELLOWS' TICKETS.

Fellows are particularly requested to observe the rules of the Society governing the use of personal passes and transferable tickets. The personal passes must only be used by the Fellows themselves ; a transferable ticket must be retained by the person who has used it to pass him into the particular Show. All personal passes and transferable tickets must be produced to the Society's Officers on demand.

ADMISSION TO MEETINGS WITHOUT TICKETS.

Any Fellow who attends the Society's Meetings at its Halls without producing his ticket will be asked to pay the entrance money and sign his name in a special book. The entrance money will be refunded to him on written application to the Secretary.

GARDENERS' TICKETS FOR THE GREAT SPRING SHOW AT CHELSEA.

Any gardener or employee in a private, public or botanic garden, nursery or seed establishment may obtain tickets at reduced prices for the Great Spring Show, admitting on the Thursday of the Show, on application direct to the Secretary, R.H.S., Vincent Square, Westminster, S.W. 1, not less than three days before the Show. All applications must be on the special forms which may be obtained from the Secretary.

KINDRED SOCIETIES' SHOWS.

The following Kindred Societies will hold Shows in the Society's Hall on the dates given in the Calendar, and Fellows' and Associates' tickets will admit: Alpine Garden Society, British Carnation Society, Rhododendron Association, Iris Society, British Delphinium Society, Cactus and Succulent Society, National Carnation and Picotee Society, British Gladiolus Society, London Gardens Society, London Allotments and Gardens Show Society, National Rose Society (September Show), National Dahlia Society and National Chrysanthemum Society (September Show).

Fellows and Associates of the R.H.S. will be admitted to the November Show of the National Chrysanthemum Society, on presenting their tickets, by payment of 1*s*. each.

The National Auricula and Primula Society and the London Viola and Pansy Society will stage their exhibits at the ordinary fortnightly meetings.

FORM OF BEQUEST.

I give and bequeath to the Treasurer for the time being of The Royal Horticultural Society, London, the sum of £ , to be paid out of such part of my personal estate as I can lawfully charge with the payment of such legacy, and to be paid free of legacy duty, within six months of my decease; the receipt of such Treasurer to be a sufficient discharge for the same. And I declare that the said legacy shall be applied towards [the general purposes of the Society].

ROYAL HORTICULTURAL SOCIETY'S HALLS.

When not in use by the Society, the Halls, Lecture Room and Committee Rooms may be hired at reasonable rates for any large gatherings, such as Exhibitions, Shows, Concerts, Bazaars, Meetings and Balls.

Copies of the regulations and terms for hiring the Halls and Rooms may be obtained on application to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1.

INFORMATION AND INQUIRIES.

Fellows may obtain information and advice from the Society as to the names of flowers and fruits, on points of practice, attacks of insects and fungi, and on other questions. All inquiries should be sent direct to the Secretary, R.H.S. Offices, Vincent Square, S.W. 1.

HOW TO SEND SPECIMENS FOR IDENTIFICATION.

When inquiring the name of a plant or a fruit Fellows would greatly facilitate identification of the specimen by observing the following rules:

1. Send a good strong piece, bearing leaves and at least three blossoms. Cut the flowers in the bud stage or they will be over before

they arrive. It is rarely possible and never wise to name a plant from its leaf alone, and poor specimens with only one blossom make identification unnecessarily difficult.

2. Wrap in soft paper and then pack in moss or even damp grass. Do not use cotton-wool. Specimens should not be pressed.

3. Give all the information you can respecting the specimens, including the size of the plant and the country of origin or natural habitat, if known. With a garden plant, say where it is growing, greenhouse or open, sun or shade, etc.

4. Of fruits, send at least three perfect specimens of a variety. Do not send until the fruits are mature, and then choose specimens representative of the particular variety. Avoid sending bruised, diseased or abnormal fruits. Include with each variety a typical shoot with foliage. Number each variety, preferably in Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper and pack it carefully and securely in wood-wool or similar material. Flimsy cardboard boxes are usually crushed in the post, while scented soap boxes taint the fruit and obscure the characteristic flavour. Give all the information you can respecting the age of the trees and how they are grown, *e.g.* indoors or out, as cordons, bushes or standards, etc.

5. It is a convenience if specimens are sent so as to reach the office on the day before a Show day, as it is then possible to enlist the services of the experts on the Committees.

INSPECTION OF GARDENS.

Inspection of gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz.: a fee of £3 3*s.* for one day (or £5 5*s.* for two consecutive days), together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Should two or more Fellows residing in the same district, with their gardens within easy reach of one another, desire to have the services of the Garden Inspector, arrangements will be made for such a combined inspection and the fee and expenses divided by consent of those concerned. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their garden. Gardens can only be inspected at the *written* request of the *owner*.

SALE OF EXHIBITS AT SHOWS.

The attention of Fellows is drawn to the Society's rule that nothing may be sold for removal during a Show. Misunderstandings with regard to this rule sometimes occur, and its strict observance is essential for the smooth running of the meetings.

THE SOCIETY'S GARDENS.

Presented by the late Sir Thomas Hanbury, K.C.V.O.

WISLEY COMMITTEE

appointed under the Hanbury Trust Deed.

Trustees.

C. R. SCRASE-DICKINS, M.A., D.L., V.M.H.
The MARQUESS OF HEADFORT.
The EARL OF STAIR, D.S.O., J.P., D.L.

R.H.S. Representatives.

PRESIDENT, *ex-officio.*
TREASURER, *ex-officio.*
C. T. MUSGRAVE, V.M.H.

Trustees of the Wisley Gardens Endowment Fund.

THE PRESIDENT AND COUNCIL OF THE SOCIETY.

An important part of the work of the Society is carried out at its Gardens at Wisley. The Society has always maintained a garden for the practical side of its work: in its early days at Kensington, then at Ealing and Chiswick, and finally, in 1903, through the kindness of Sir THOMAS HANBURY, the present Gardens at Wisley, which were handed over to the Society in trust and which have since been considerably enlarged.

Director.

R. L. HARROW, V.M.H.

Keeper of the Laboratory.

M. A. H. TINCKER, M.A., D.Sc., F.L.S.

Mycology.

D. E. GREEN, M.Sc.

Entomology.

G. F. WILSON, F.L.S., F.R.E.S., N.D.H.

Botany.

N. K. GOULD.

Assistant for Trials.

F. C. BROWN.

Assistant for Fruit Experiments.

J. M. S. POTTER, N.D.H.

Chief Clerk.

W. D. CARTWRIGHT.

Keeper of the Gardens.

W. J. BLAKEY.

Superintendent of Floral Department.

Superintendent of Rock Garden Department.

J. T. WALL.

Foreman of Glass Department.

Artist.

A. J. WISE.

Caretaker and Engineer.

Assistant to the Director.

B. O. MULLIGAN, N.D.H.

The whole of the work at Wisley is under the control of the President and Council of the Society, whose object is to develop the garden in such a way that it will meet all the requirements of horticulture and serve not only for the enjoyment and instruction of Fellows, but also for the advancement of horticultural science.

Trials of plants, fruits, vegetables, and sundries are held annually with the object of discovering the best of their several kinds and varieties. At the same time the varieties are described and classified.

The laboratory provides accommodation for the work of the members of the staff and for the instruction of student gardeners who receive training in both the science and practice of gardening.

A prospectus of the School of Horticulture may be had on application to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1; or to the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

Practical demonstrations of garden operations are held at suitable seasons: see Calendar of Shows and Fellows' Tickets.

ADMISSION TO THE GARDENS AT WISLEY.

The gates will be open on week-days, including Bank Holidays (but Good Friday and Christmas Day excepted), from 10 A.M. to sunset, or to 7.30 P.M. (whichever is the earlier), on Sundays from the first Sunday in April to the last Sunday in September from 2 to 6 P.M., and on Sundays in October from 2 to 5 P.M.

Fellows of the Society, on showing their tickets, have free personal admission to the Gardens on all occasions when the gates are open.

Friends of Fellows will be admitted on presenting a Fellow's Transferable Ticket, which will admit three persons in all.

The public are admitted on week-days on payment of 2*s.* 6*d.* for adults, and 1*s.* for children under the age of 15 years; admission on Sundays is reserved for Fellows and their Friends.

Children under the age of 15 years will not be admitted unless accompanied by an adult, who will be held responsible for their conduct while in the Gardens.

Members of affiliated Societies and of Horticultural and Scientific Institutions desirous of visiting the Gardens in parties will be afforded free admission on application to the Director of the Gardens by the responsible authority. Applications for such visits should be made at least 14 days in advance.

All other bodies desirous of visiting the Gardens in parties should apply to the Secretary of the Royal Horticultural Society, stating the number of the party and date of anticipated visit. Such parties will be required to pay 1*s.* a head, with a minimum of 10*s.*, and must purchase tickets in advance.

No dogs or perambulators will be admitted. Parcels, baskets, etc., must be left at the gate.

HOW TO GET TO THE GARDENS.

The Gardens are situated at Wisley in Surrey, within a short distance of the main Portsmouth Road, about a mile on the London side of Ripley. They are distant about four miles from Byfleet and West Weybridge Stations, four from Effingham and Horsley, and five from Weybridge, all on the Southern Railway. Motors can always be hired

from Mr. Howard at Byfleet Station (6*s*. each way), or from Messrs. Shanks, Weybridge (8*s*. each way).

Byfleet, West Weybridge, and Weybridge Stations are on the Southern Railway Main Line and are served by a convenient service of electric trains from Waterloo. There are connexions with Chertsey and Reading at Weybridge.

Effingham and Horsley Stations are also served by a frequent service of electric trains from Waterloo and Guildford.

Cheap day tickets are issued from Waterloo as under:

To	*Return Fares.*		*On*
	1st Class.	*3rd Class.*	
Effingham Junction	4*s*. 3*d*.	2*s*. 9*d*.	Week-days and Sundays by all trains.
Horsley	4*s*. 6*d*.	3*s*. 0*d*.	
Weybridge	3*s*. 9*d*.	2*s*. 6*d*.	
West Weybridge	4*s*. 3*d*.	2*s*. 9*d*.	
Byfleet	4*s*. 6*d*.	3*s*. 0*d*.	

Available for return by any train on the day of issue.

An hourly service (half-hourly on Sundays in the summer) of omnibuses—Service No. 215 (Mondays to Friday), and No. 20 (Saturday and Sunday)—runs along the Portsmouth Road between Kingston Omnibus Station, near Kingston Railway Station, and North Street, Guildford, and passes within 5 minutes' walk of the Gardens; and other local services within about a mile.

Service Nos. 20 and 215 provide connexions with other services as under:

At Cobham (*White Lion*) with Service No. 462 for Stoke D'Abernon, Leatherhead, Weybridge, Addlestone, Chertsey, Staines, Wraysbury, and Slough.

At Esher (*Bear Hotel*) with Service No. 218 for Hersham, Walton-on-Thames, Lower Halliford, and Shepperton and Laleham.

At Kingston Omnibus Station with Service Nos. 14 (Saturdays and Sundays in summer only) and 85 for Roehampton and Putney Bridge Station (District Line), with Service No. 65 for Petersham, Richmond, Brentford, and Ealing, and with Service No. 406 for Tolworth, Epsom, Tadworth, Kingswood and Reigate.

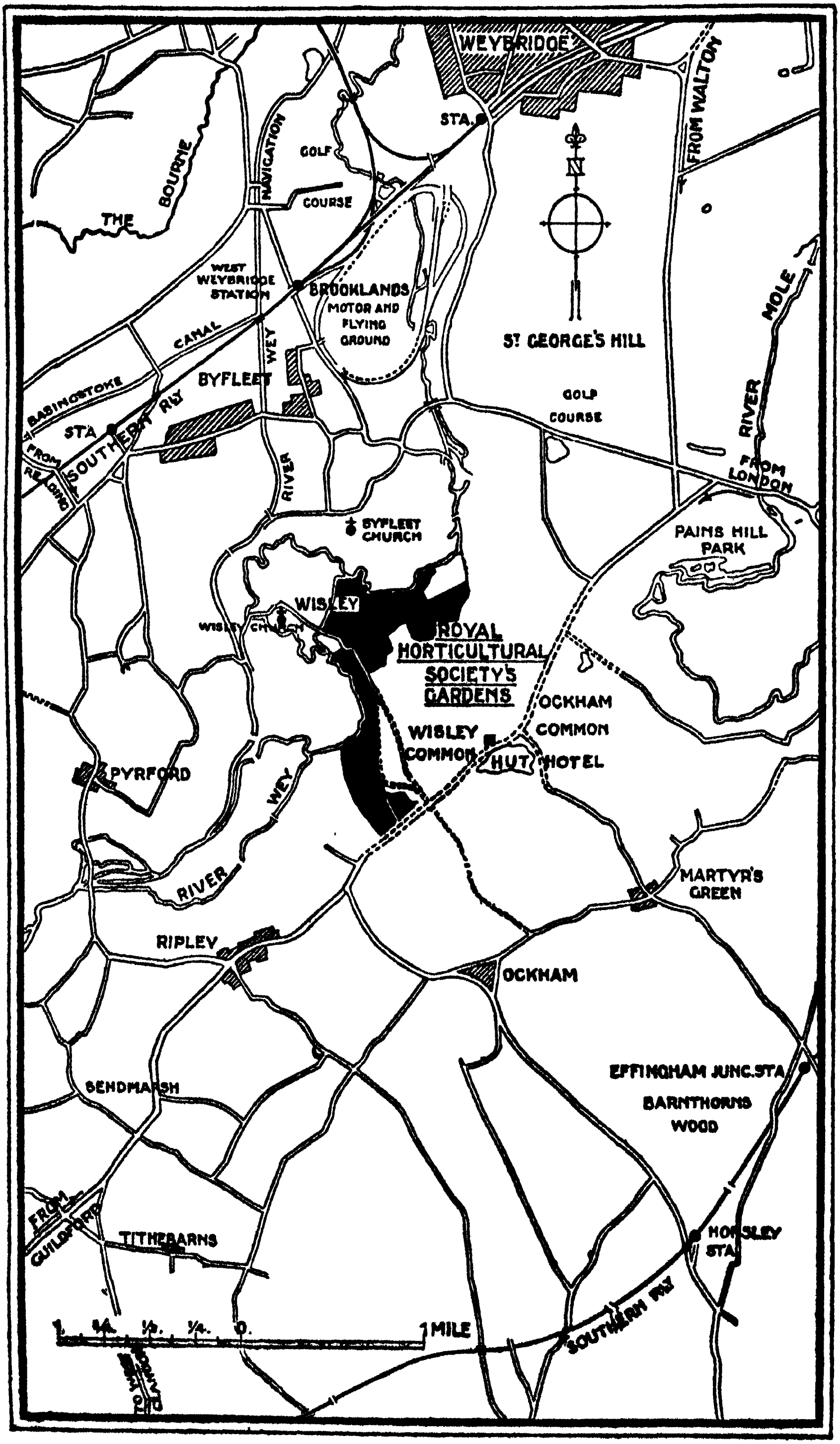
At Ripley with Service No. 436 for Woking, Byfleet, Chertsey and Staines.

At Staines with Service No. 441 for Egham, Windsor, Slough, Beaconsfield and High Wycombe.

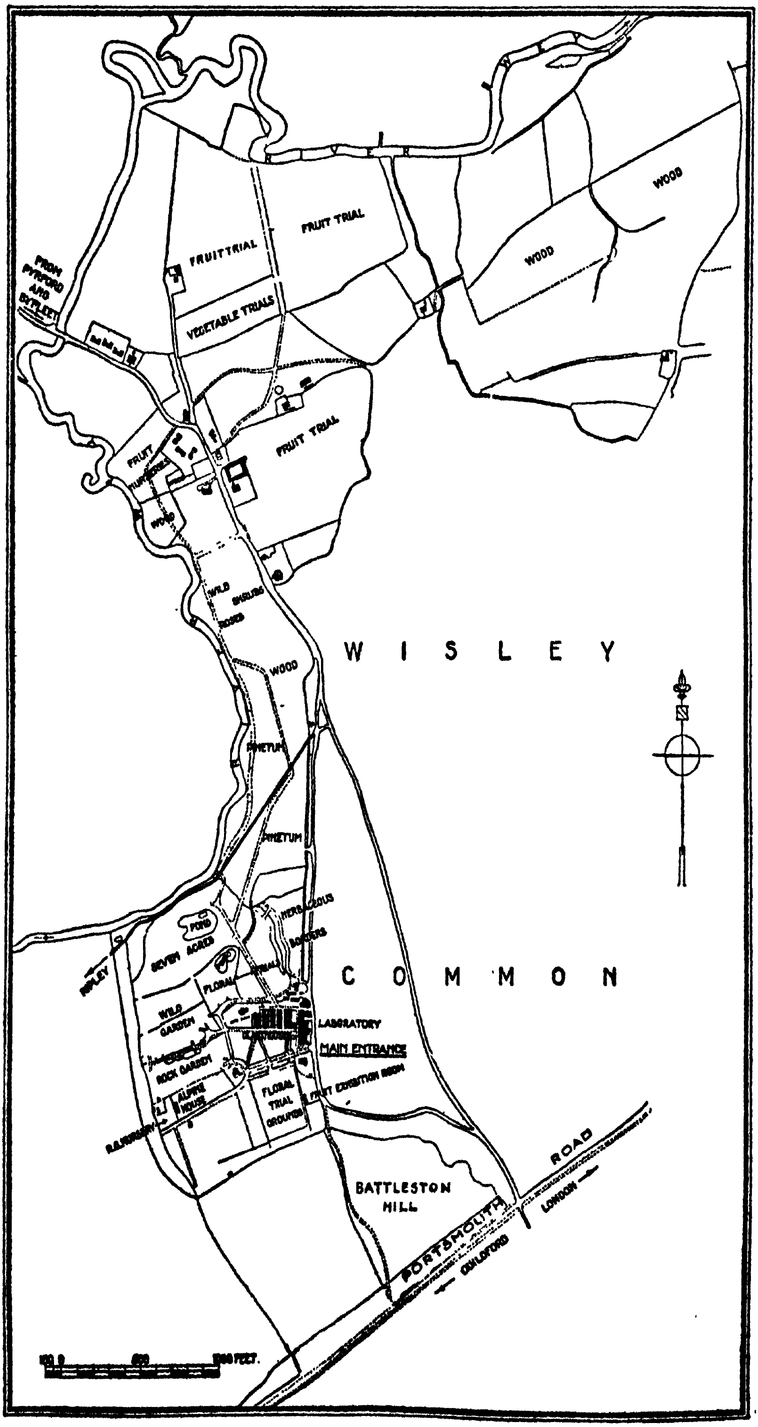
From Guildford omnibuses run to all parts of Surrey.

The "Green Line" also runs a half-hourly coach service (every 20 minutes at week-ends) between Guildford and Hertford, via Marble Arch. The coaches stop by request at the R.H.S. Gardens turning on the Portsmouth Road (5 minutes' walk).

For times, the London Passenger Transport Board's Time-tables should be consulted.



WISLEY GARDENS.—ROUTE MAP.



PLAN OF THE SOCIETY'S GARDENS, WISLEY.

TRIALS.

As mentioned above, trials of Fruit, Vegetables and Flowers are being continuously carried out, and these are based on a regular Calendar. The rules governing these trials at Wisley may be had on application to the Secretary, R.H.S. Offices, Vincent Square, S.W. 1, or to the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, to whom all articles for trial should be addressed. The Trials arranged for 1939-40 are as follows:

INVITED TRIALS, 1939-40.

TO BE JUDGED IN 1939.

VEGETABLES.

Brussels Sprouts . . .	1 oz. of each variety to be sent by January 31.
Melons in Frames . .	1 packet ,, ,, ,, ,, ,,
Outdoor Cucumbers . .	1 ,, ,, ,, ,, ,, ,,
Runner Beans . . .	½ pint ,, ,, ,, ,, ,,

FLOWERS.

(Other than the Standard Collections.)

China Asters (Late varieties)	1 packet of each variety to be sent by January 31.
Viola cornuta types and hybrids from seed . .	1 ,, ,, ,, ,, ,, ,,
Heliotropes . . .	3 plants ,, ,, ,, ,, ,,

(Standard Collections.)

The varieties selected for trial by the Joint and Floral Committees will be asked for by individual notices sent direct to the persons or nurserymen concerned.

PREPARATION FOR TRIALS IN 1940.

To prepare for the trials given in the Biennial Calendar, some of the seeds and plants are required sufficiently in advance to become established by the time appointed for their consideration by the judges, namely:

To be sent in 1939.	For Judging in 1940.	
		Broccoli (January-March varieties), 1 oz. of each variety to be sent by January 31, 1939. Iceland and Shirley Poppies, Sweet Williams. 1 packet of each variety to be sent by April 29, 1939.

The following trials will be repeated during 1939:—

Vegetables:

Cos Lettuce.
Late Culinary Peas.
Autumn Sown Onions.

Floral:

Godetias.
Dimorphothecas.
Montbretias (plants now growing at Wisley).

These "repeat" trials are due to the somewhat difficult weather during 1938. The senders will be asked to submit once again the varieties previously sent for trial.

CALENDAR OF R.H.S. "INVITED" TRIALS.

	1939.*	1940.*
	Joint Committee Trials of Yearly Selected Varieties.	*Joint Committee Trials of Yearly Selected Varieties.*
Flowers .	New Dahlias	New Dahlias
	New Delphiniums	New Delphiniums
	New Irises	New Irises
	New Sweet Peas	New Sweet Peas
	New Border Carnations	New Border Carnations
	New Chrysanthemums (Early-flowering)	New Chrysanthemums (Early-flowering)
	New Rhododendrons and Azaleas	New Rhododendrons and Azaleas
	Other than Standard Collections.	*Other than Standard Collections.*
	China Asters (Late varieties)	Iceland Poppies
	Viola cornuta types and hybrids from seed	Shirley Poppies
	Heliotropes (Plants)	Sweet Williams
		Pentstemons from seed
		Pansies from seed
Vegetables .	Brussels Sprouts	Kales
	Melons in Frames	Broccoli (January–March varieties)
	Outdoor Cucumbers	Tomatos (outdoor varieties)
	Runner Beans	Cabbage Lettuces

The Gardens themselves now cover nearly 228 acres, further land of about 28 acres consisting of a piece of property known as Battleston Hill and the adjoining field fronting on the Portsmouth Road having been acquired. The Gardens are laid out on the general lines shown on the plan on p. 25.

A section of the work at the Gardens of national importance is the trials of all kinds of hardy fruit for commercial planting. These trials are conducted under a Joint Committee of the Ministry of Agriculture and Fisheries and the Royal Horticultural Society (see p. 57). They commenced in 1922, and many useful results are being obtained. Reports of the trials are published from time to time in the Society's JOURNAL.

DISTRIBUTION OF SURPLUS PLANTS.†

Every year in March surplus plants and seeds are distributed to those Fellows who apply for them. Of many varieties the stock is limited, and the application forms are therefore collected, and from time to time are thrown into ballots and then drawn at random. The demands of each list are then satisfied as far as the available stock permits, and those Fellows who are disappointed by not receiving the plants for which they ask, must remember that there is no other method of treating all alike.

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* See above for quantities to be sent, and dates when they are required. Senders are urgently requested to consult the list which asks for certain plants, etc., to be sent a year or two in advance of that in which they will be judged.

† These are plants which are surplus to the requirements of the Wisley Gardens, and as the Gardens become fully planted the number available may be diminished.

Fellows are asked to remember that the plants will necessarily be small and need careful handling when received. It is obvious that owing to their numbers the plants distributed could not be kept in the Gardens and grown on until they had reached a large size.

All application forms should be returned before the end of February, and no application can be entertained which is received after the end of April.

The Society does not pay the cost of packing and carriage. The parcels must be sent by post, the postage being prepaid by the Fellows themselves. Directions as to the amount of remittance to be sent for this purpose will be found on the application forms for plants, and Fellows are requested to follow out carefully all the directions there printed.

Fellows residing beyond a radius of thirty-five miles from London are permitted to choose double the number of plants to which they would otherwise be entitled. Fellows residing abroad, subscribing one guinea per annum, are allowed twenty packets of seeds, and higher rates of subscriptions in proportion.

Fellows residing outside the United Kingdom and Ireland may apply for seeds on the list on the form provided, but plants cannot be sent to them owing either to difficulty of transport or to Government restrictions. Endeavour will, however, be made to procure for them to a reasonable extent any rare or unusual seeds which they cannot procure in the country where they live.

No plants will be sent to Fellows whose subscriptions are in arrear, or who do not fill up their forms properly.

EXAMINATIONS IN HORTICULTURE.

The Society conducts several examinations in horticulture, and the regulations and syllabus for any of them can be obtained by writing to the Secretary, R.H.S. Offices, Vincent Square, Westminster, S.W. 1.

The dates * for these examinations are given in the Calendar.

NATIONAL DIPLOMA IN HORTICULTURE.

Written Examinations: Preliminary, Final.
Practical Examinations: Preliminary, Final.

This is the highest examination in horticulture conducted by the Society, and was established in 1912, with the sanction of the Board of Agriculture, as a test of real professional ability.

Among those for whose benefit the Diploma was established are the following: Florists, Fruit Growers, Gardeners, Horticultural Inspectors, Horticultural Instructors,† Landscape Gardeners, Market Gardeners, Nurserymen, Public-Park Gardeners and Seedsmen.

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* These dates are subject to alteration.

† This does not include a School Master or Mistress who is engaged in teaching other subjects in schools, but applies only to persons whose chief work in life is devoted to giving instruction in horticulture. The examination is for the horticultural profession only.

The examination is designed to test, first, a candidate's practical knowledge and, secondly, his acquaintance with the principles underlying garden practice. The examiners will do their best to discourage "cramming," and to insist on practical experience. Books are valuable only when used intelligently to supplement experience.

TEACHERS' EXAMINATIONS IN SCHOOL AND COTTAGE GARDENING.

Preliminary Examination: Written.
Advanced Examination: Written and Practical.

This examination is not exclusively confined to members of the scholastic profession, but is open to all persons who can furnish a satisfactory certificate of having done practical work. Candidates in both the preliminary and advanced examinations must satisfy the examiners that they have had practical gardening experience.

GENERAL EXAMINATION.

General Examination for Seniors (18 years of age and over).
General Examination for Juniors (under 18 years).

This examination is held by the Royal Horticultural Society to assist the efforts of County Councils, Technical Institutes, Schools, Gardeners' Mutual Improvement Societies and other bodies to promote instruction in practical horticulture, and in the hope of rendering such instruction definite and effective.

NATIONAL CERTIFICATE IN ELEMENTARY HORTICULTURAL PRACTICE.

An examination in horticulture for students in Farm Institutes has been established, open only to students who have taken at least one year's course in horticultural work and in the principles underlying horticultural practice in an approved institution. Alternative syllabuses have been prepared, and the examination consists of both written and practical parts. Particulars of this examination may be had at the Institutions concerned.

BRITISH FLORAL ART DIPLOMA.

This examination was established in 1933 with the object of encouraging and stimulating interest in this craft by the establishment of a Diploma.

The examination is open to both men and women ; the date of the 1939 examination is given in the Calendar.

There is no age limit, but the number of candidates accepted for each examination will be limited.

There are both practical and written examinations, and Diplomas will be awarded to successful candidates.

The examination is intended primarily for florists and florists' assistants, but is not confined to members of the florists' trade.

AWARDS AND MEDALS.

The following awards are made by the Council :—

CERTIFICATES.

The awards given to plants, flowers, fruits and vegetables are :—

1. FIRST CLASS CERTIFICATE.—Instituted 1859. Given on the recommendation of the Fruit and Vegetable, Floral, Orchid, Narcissus and Tulip, and the Joint Committees to plants, flowers, fruits and vegetables of great excellence.

2. AWARD OF MERIT.—Instituted 1888. Given on the recommendation of the Fruit and Vegetable, Floral, Orchid, Narcissus and Tulip, and the Joint Committees to plants, flowers, fruits and vegetables which show a sufficiently distinct advance on their predecessors.

3. PRELIMINARY COMMENDATION.—Instituted 1931. Given at Shows on the recommendation of the Floral, Orchid, Narcissus and Tulip, and the Joint Committees; the award for a new plant of promise whether a new introduction from abroad or of garden origin.

4. HIGHLY COMMENDED.

5. COMMENDED.

These two Awards are given on the recommendation of the Fruit and Vegetable, Floral, Orchid, Narcissus and Tulip, and the Joint Committees to noteworthy plants, flowers, fruits and vegetables after trial at Wisley or elsewhere.

6. BOTANICAL CERTIFICATE.—Instituted 1878. Given on the recommendation of the Scientific Committee to plants of botanical interest.

7 AWARD OF GARDEN MERIT.—Instituted 1921. Given on the recommendation of the Wisley Advisory Committee to plants which either are well known to the Council, Committees and Garden Staff, or have been tested and grown at Wisley in the same manner as they would have been grown in a private garden, and have proved to be excellent for ordinary or greenhouse use.

A plant that has received this award is not thereby precluded from receiving other awards.

The following awards are given to individuals :—

8 CERTIFICATE OF APPRECIATION.—Instituted 1908. Given on the recommendation of the Scientific Committee to persons whose work is of scientific interest from a horticultural point of view, or is such as may be reasonably expected to assist in the improvement of a strain or in creating a new break.

9. CERTIFICATE OF CULTURAL COMMENDATION.—Instituted 1872. Given on the recommendation of the Fruit and Vegetable, Floral, Orchid, Narcissus and Tulip, and the Joint Committees to growers whose exhibits show evidence of great cultural skill.

The following awards are given to Sundries after trial on the recommendation of the Wisley Advisory Committee :—

(*a*) AWARD OF MERIT.

(*b*) HIGHLY COMMENDED.

(*c*) COMMENDED.

MEDALS.

1. THE LAWRENCE MEDAL.—Instituted in 1906 to celebrate Sir Trevor Lawrence's twenty-one years' tenure of office as President of the Society. Awarded directly by the Council annually for the best exhibit shown to the Society during the year. No exhibitor may receive this gold medal more than once in three years.

2. THE GOLD MEDAL.—Instituted in 1898. Re-designed in 1929. Awarded for exhibits of special excellence.

3. THE FLORA MEDAL.—Instituted in 1836. Awarded for exhibits of flowers and ornamental plants. Struck in bronze, silver and silver-gilt.

4. THE BANKSIAN MEDAL.—Instituted in 1820 in commemoration of Sir Joseph Banks, P.R.S., one of the founders of the Society. Awarded for exhibits of flowers and ornamental plants. Struck in bronze, silver and silver-gilt.

5. THE HOGG MEDAL.—Instituted in 1898 in commemoration of Dr. Robert Hogg, the great pomologist, sometime Secretary of the Society. Awarded for exhibits of fruit. Struck in bronze, silver and silver-gilt.

6. THE KNIGHTIAN MEDAL.—Instituted in 1836 in honour of Thomas Andrew Knight, F.R.S., President of the Society, 1811 to 1838. Awarded for exhibits of vegetables. Struck in bronze, silver and silver-gilt.

7. THE LINDLEY MEDAL.—Instituted in 1866 in commemoration of Dr. John Lindley, F.R.S., sometime Secretary of the Society. Awarded for exhibits of a plant or plants of special interest or beauty or showing exceptional skill in cultivation, and for educational exhibits. Struck in bronze, silver and silver-gilt.

8. THE GRENFELL MEDAL.—Instituted in 1919 in commemoration of Field-Marshal Lord Grenfell, President of the Society, 1913 to 1919. Awarded for exhibits of pictures, photographs or objects of a similar nature of horticultural or botanical interest. Struck in bronze, silver and silver-gilt.

9. THE WILLIAMS MEMORIAL MEDAL.—Instituted in 1896 by the Trustees of the Williams Memorial Fund in commemoration of B. S. Williams. Re-designed in 1927. Awarded directly by the Council for a group of plants and/or cut blooms of one genus which show excellence in cultivation. Fruit and vegetables are excepted. Two medals in gold are annually available for award.

10. THE P. D. WILLIAMS MEDAL.—Instituted in 1936, the fund being subscribed to commemorate the late P. D. Williams, V.M.H. Awarded for Daffodils and Rhododendrons. In 1939 three medals are offered for award in a class at the Daffodil Show on April 13 and 14 (see special schedule). Struck in gold, silver-gilt, silver and bronze.

11. THE SANDER MEDAL.—Instituted in 1923 and presented by the firm of Messrs. Sander & Sons in memory of H. F. C. Sander, F.L.S., V.M.H., the founder of the firm. Awarded to the exhibitor of the best new greenhouse plant of general utility shown to the Society during the year. Struck in gold.

12. THE GEORGE MOORE MEDAL.—Instituted in 1926 and presented by the late G. F. Moore, V.M.H. Awarded to the exhibitor of the best new Cypripedium shown to the Society during the year. Struck in gold.

13. THE HOLFORD MEDAL.—Presented by the Executors of the late Sir George Holford in 1928. Awarded for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Society's Halls. Struck in gold.

14. THE SEWELL MEDAL.—Instituted in 1929 and presented by the late A. J. Sewell. Awarded for exhibits of plants suitable for the rock garden or alpine house. Struck in gold. In 1939 five medals are offered for award, two on April 4, two on May 2 and one on June 6. One medal is offered on each date for an amateur's exhibit; on the first and the last dates one medal is also offered for a horticultural trader's exhibit. Each amateur's exhibit must consist of three, and each horticultural trader's of six, pots or pans not exceeding 12 inches in diameter if circular, or 112 sq. inches in internal area if rectangular. Only one subject may be shown in each pot or pan. It is not necessary that the plants should have been grown in the receptacles in which they are shown and, if desired, plants may be lifted and potted for the purposes of the competition. Not fewer than two-thirds of the plants in each exhibit must be in bloom, and plants which are not in bloom should possess decorative value when shown. The scale of points for judging will be as follows: Suitability, 24 points; Rarity, 18 points; Cultivation, 24 points. Entries must be made on special forms obtainable from the Secretary, by whom the completed forms must be received not later than by the first post on the Wednesday preceding the Show.

15. THE VEITCH MEMORIAL MEDAL.—Instituted in 1870 in commemoration of James Veitch of Chelsea. In 1922 the Veitch Memorial Trust was vested in the Council of the Society. Awards of medals and prizes are made annually to those who have helped the advancement of the science and practice of horticulture, and for special exhibits. Struck in bronze, silver and gold.

Any medal awarded at one of the Society's Meetings is awarded to the exhibitor and for a particular exhibit. The Award may not be advertised by any one other than the exhibitor, and the exhibitor may only advertise the Award by using the terms of the Award card, *i.e.* by quoting the words " for an exhibit of Begonias," or " for an exhibit of Delphiniums," or as the case may be.

The Council, having ascertained that the majority of firms who exhibit at the Society's Meetings do not desire to possess many medals of the same grade, has decided that the first time a horticultural trader is awarded a medal it will be forwarded, but no medal of the same grade will be sent afterwards unless application is made within a year from the date of the award. Medals will never be sent out unengraved.

CUPS.

CHALLENGE CUPS.

The following cups are offered for award at the Society's Meetings. A challenge cup, unless otherwise stated, will be held for one year by the winner, who will be required to give a guarantee for its return in good condition. The winner will receive a certificate recording his success and, except where a replica of the cup is supplied, his gardener will receive an appropriate silver Hogg, Knightian or Banksian Medal. The decision of the Council is final and any cup may be withheld at its discretion.

1. THE AFFILIATED SOCIETIES' CUP.—Founded in 1908 by the Society and offered for the best collection of fruit shown by an Affiliated Society in the special class at the Fruit and Vegetable Show on October 10, 1939. For conditions see special schedule.

2. THE CAIN CUP.—Presented by Sir Charles Nall-Cain, Bt. (Lord Brocket) in 1920. Offered for the best exhibit shown by an amateur at the Great Spring Show at Chelsea. Applications for space should be made on the form in the schedule.

3. THE CLAY CHALLENGE CUP.—Presented by Messrs. Clay in 1913. Offered to the raiser of a rose of good form and colour, not in commerce before the current year, and possessing the true old rose scent, such as may be found in the old Cabbage or Provence Rose, in ' General Jacqueminot,' ' Marie Baumann,' ' Duke of Wellington,' ' General McArthur,' etc. The scent known as " tea rose " is not, for the purposes of this competition, to be counted the true old rose scent. Not more than three different varieties may be shown by one competitor. At least three and not more than six blooms or trusses of each variety will be required, together with a plant in flower and bud. The cup will be awarded only once for the same rose. Open for competition to trade and amateur growers at the Fortnightly Show on July 18, 1939. Entries must be received not later than by the first post on the Wednesday preceding the Show, on special forms obtainable from the Secretary.

4. THE CORONATION CUP.—Founded in 1911. Usually offered for the best exhibit at the Great Autumn Show when held.

5. THE ENGLEHEART CUP.—Founded in 1913 by the Society and offered at the annual Daffodil Show for one stem of each of twelve varieties raised by the exhibitor. See special schedule.

6. THE FOREMARKE CHALLENGE CUP.—Presented by Sir Francis Burdett, Bt., in 1919. Offered for twenty spikes of named Gladioli in not less than ten varieties and not more than two spikes of any one variety. Open for competition to trade and amateur growers at the Fortnightly Show on August 15, 1939. Entries must be received not later than by the first post on the Wednesday preceding the Show, on special forms obtainable from the Secretary.

7. THE GEORGE MONRO MEMORIAL CUP.—Presented in 1921 by Mr. George Monro and his brothers in memory of their father. Offered for the best exhibit of grapes shown by an amateur at the Fruit and Vegetable Show on October 10, 1939. The conditions of the competition will be found in the special schedule.

8. THE GORDON-LENNOX CUP.—Presented by Lady Algernon Gordon-Lennox in 1913. Offered for the most meritorious exhibit of fruit shown by an amateur at the Fruit and Vegetable Show on October 10, 1939. Conditions will be found in the schedule. The winner's gardener will receive a replica of the cup presented by Lady Algernon Gordon-Lennox.

9. THE ORCHID CHALLENGE CUPS.—Presented by the Orchid Trade. An exhibitor winning one of these cups three times retains it in perpetuity.

(*a*) A CHALLENGE CUP for the best group of orchids exhibited at the Great Spring Show, Chelsea, in a space not exceeding 45 square feet by an amateur who employs not more than three assistants in the orchid houses, including the head gardener. Applications for space should be made on the form in the schedule.

(*b*) A CHALLENGE CUP for the best group of orchids exhibited at the Fortnightly Show on October 24, 1939, in a space not exceeding 60 square feet, by an amateur who employs not more than three assistants in the orchid houses, including the head gardener. Entries must be received not later than by the first post on the Wednesday preceding the Show, on special forms obtainable from the Secretary.

10. THE R.H S. VEGETABLE CHALLENGE CUP.—Founded in 1910. Offered at the Fruit and Vegetable Show on October 10, 1939, to the competitor who secures the greatest number of first-prize points for exhibits of vegetables.

11. THE SHERWOOD CUP.—Presented in 1920 by the members of the Sherwood family in memory of N. N. Sherwood. Offered for award by the Council directly for the most meritorious exhibit of the Great Spring Show at Chelsea. Applications for space should be made on the form in the schedule.

12. THE WIGAN CUP.—Presented by Mr. A. L. Wigan in 1911. Usually offered for the best exhibit of roses shown at the Great Autumn Show when held.

CUPS AND TROPHIES TO BE WON OUTRIGHT.

13. THE REGINALD CORY MEMORIAL CUP.—This cup is given with the view of encouraging the production of hardy hybrids of garden origin, and will be awarded only to the raiser of a plant that is the result of an intentional cross. Only a hybrid of which one parent is a true species is eligible, and it must have been exhibited at one of the Society's Shows and received an Award during the current year. Hybrids of annuals and biennials do not come under the scope of the award. By " hardy " is meant, hardy at Kew.

14. THE CYMBIDIUM TROPHY.—A silver trophy, presented by the Orchid Trade, is offered for award at the Fortnightly Show on March 21, 1939, for an exhibit of 12 Cymbidium plants (species and/or hybrids) staged by an amateur. Entry forms may be had on application to the Secretary, and must be returned not later than by the first post on Wednesday, March 15, 1939.

15. THE CYPRIPEDIUM TROPHY.—A silver trophy, presented by the Orchid Trade, is offered for award at the Fortnightly Show on January 10, 1939, for an exhibit of 25 Cypripedium plants (species and/or hybrids) staged by an amateur. Entry forms may be had on application to the Secretary, and must be returned not later than by the first post on Wednesday, January 4, 1939.

16. A SILVER CUP FOR DAFFODILS.—A silver cup, presented by Messrs. Barr & Sons, Ltd., is offered for award at the Daffodil Show, April 13 and 14, 1939, to the competitor who obtains the highest total number of prize-points in the single-bloom classes for amateurs. (See special schedule.)

17. THE ODONTOGLOSSUM TROPHY.—A silver trophy, presented by the Orchid Trade, is offered for award at the Fortnightly Show on April 18, 1939, for an exhibit of 25 Odontoglossum plants (species and/or hybrids, including Odontiodas, etc.) staged by an amateur. Entry forms may be had on application to the Secretary, and must be returned not later than by the first post on Wednesday, April 12, 1939.

18. ORCHID TROPHIES, presented by the Orchid Trade for competition at the Fortnightly Show on October 24, 1939.

(*a*) A silver trophy for the best twelve orchids, not more than two of any one genus, exhibited by an amateur who employs not more than two growers, including the head gardener, in his orchid houses.
(*b*) A silver trophy for the best six orchids exhibited by an amateur who employs not more than one orchid grower or gardener.

Entries must be received not later than by the first post on the Wednesday preceding the Show, on special forms obtainable from the Secretary.

19. THE RIDDELL TROPHY FOR VEGETABLES.—A silver trophy is provided each year from a fund established in 1931 by Lord Riddell for the encouragement of the cultivation and exhibition of vegetables. In 1939 the trophy is offered for award in the class for a table of vegetables at the Fruit and Vegetable Show, October 10, 1939. (See special schedule.)

20. THE SUTTON VEGETABLE CUPS.—Messrs. Sutton & Sons Ltd. present annually two cups for vegetables.

One is offered for award for the best group of vegetables shown by an amateur at the Great Spring Show at Chelsea. (See special schedule.)

The other is offered for the best exhibit of twelve distinct kinds shown by an amateur in the special class at the Fruit and Vegetable Show. (See special schedule.)

21. A SILVER TROPHY FOR CACTI AND SUCCULENTS.—A silver trophy provided from Mrs. Sherman Hoyt's Prize Fund is offered for the best group of Cacti and/or succulents staged by an amateur at the Fortnightly Show on September 12, 1939. Entries must be received not later than by the first post on the Wednesday preceding the Show, on special forms obtainable from the Secretary.

THE JONES-BATEMAN CUP.

Presented by Miss L. Jones-Bateman of Cae Glas, Abergele, in 1920, for the encouragement of fruit production. Offered triennially for original research which has added to our knowledge of cultivation, genetics, or other matters relating to fruit growing. The cup is held by the winner for three years, and on being relinquished the holder receives a Hogg medal in gold. Particulars of competition may be obtained on application to the Secretary. The cup will be available for competition in 1940.

THE LODER RHODODENDRON CUP.

Presented in 1921 by Mr. G. W. E. Loder (Lord Wakehurst) in memory of his brother, Sir Edmund Loder, Bt. The cup will be awarded annually, but not more than once in seven years to the same individual. In awarding it the judges will consider, not merely floral display, but the value to horticulture of the work of the recipient, whether such work shall include the production of flowers or not. Of the five judges, three will be appointed by the Royal Horticultural Society and two by the Rhododendron Society. The award will be made in November of each year. The cup is held by the winner for one year.

PETER BARR MEMORIAL CUP.

Presented in 1912 by the Trustees of the Peter Barr Memorial Fund in commemoration of Peter Barr, V.M.H. Awarded every year on the recommendation of the Narcissus Committee to someone who in the Committee's opinion has done good work of some kind in connexion with daffodils. The cup is held by the winner for one year.

EXHIBITIONS: GENERAL NOTES.*

SHOWS have been arranged for the dates given in the Calendar, but the Council reserves the right to alter the list in any way that may from time to time seem to be in the interest of the Society. All persons, whether Fellows of the Society or not, unless excluded by some special regulation, are invited to exhibit. Schedules containing special regulations are issued for the Daffodil Show, the Early Market Produce Show, the Great Spring Show, and the Fruit and Vegetable Show.

Those who desire to exhibit at a Fortnightly Meeting at the Halls must give notice in writing to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, not later than by the first post on the Wednesday before the Meeting at which they wish to exhibit, stating the nature of the proposed exhibit and how much space it will occupy. Entry forms may be obtained from the Secretary, and exhibitors are requested to use them. Letters will be sent to exhibitors on the Wednesday before the Meeting saying what space has been allotted. If no letter is received by the Friday before the Meeting the exhibitor should at once communicate with the Secretary. There are no entry fees, nor are there any charges for space or staging for exhibits of plants, flowers, fruit, vegetables, pictures, plans, or models. A charge is made for space for exhibits of horticultural sundries at the Great Spring Show at Chelsea, but not at the Society's Halls. The Council reserves to itself the right to refuse any application for space, and, in the event of any such refusal, it is not to be required to give any reason or explanation. The allotment of space, both as regards area and position, will be in accordance with the discretion of the Council, and exhibitors must be content to abide loyally by its decision.

Fellows are specially invited to exhibit interesting or well-grown plants, flowers, fruits or vegetables, and any Fellow who desires to stage an exhibit of not more than three pots, vases, or dishes may do so at any Fortnightly Meeting, although he has not applied for space beforehand. Such exhibits must be entered with the clerk at the Small Exhibits Table by noon on the morning of the Meeting, and he will provide exhibitors' cards and stage the exhibits. Exhibitors are not permitted to place on this special table any notices or leaflets, nor may any orders be booked there. Exhibits staged under this regulation may be considered for Certificates of Cultural Commendation.

The Society's officers will, if necessary, unpack and stage small exhibits if the Secretary has been notified beforehand of their coming and of the owner's inability to accompany them, but the Society does not undertake the responsibility for their repacking or return. All parcels sent by rail or post must be sent carriage paid and at the risk of the sender, addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1. A separate notification must be sent by post at the same time.

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* A copy of the complete regulations for exhibitions may be obtained on application to the Secretary.

Exhibitors may, generally, begin staging at 2 P.M. on the day before a Fortnightly Meeting and continue until 10 P.M., when the lights will be turned out and the Hall closed. After 10 P.M. no goods can be admitted until the next morning. Staging may be resumed at 6.30 A.M. on the day of the Meeting. Exhibits intended for the Narcissus and Tulip Committee's inspection must be ready by 10.30 A.M. and most other exhibits by 11.30 A.M. At special Shows exhibits must be ready for inspection by the time given in the particular schedule. Vases, 6 inches and 9 inches in height, are provided by the Society. Exhibitors are at liberty to borrow them in return for a deposit of 2*s.* 6*d.* a dozen which is refunded when the vases are returned in good order at the end of the Meeting. White plates, 10 inches in diameter, may be borrowed from the Society by exhibitors free of charge.

Every exhibit must be entered with the Secretary of one or other of the Committees (see pp. 42–54), viz.: the Fruit and Vegetable, the Floral (which deals with flowers, foliage plants, trees and shrubs), the Orchid, the Narcissus and Tulip, the Picture, or the Scientific Committee. Exhibits intended for one Committee may not be mixed with those intended for another. Fruits and vegetables may not be combined in one exhibit, and flowers may not be mixed with either, but foliage, such as that of asparagus or small ferns, may be placed between the dishes. Tomatos rank as vegetables. Decorative vegetables, such as coloured kales, must be shown as vegetables, and not mixed with flowers unless permitted by special regulations for a particular Show or Competition. Table decorations, bouquets, wreaths and sprays of flowers are excluded unless specifically invited. Plants and produce exhibited to show the effect of different manures and soils are considered to be sundries and may only be exhibited as such. Mushroom spawn may be shown, but only among the sundries. No artificial, dyed or surface-coloured plants, flowers, foliage, fruit or vegetables may be exhibited. No seeds, dormant bulbs or corms, and no plants ordinarily grown for their flowers or fruits, but not in flower or fruit, can be admitted to the Society's Meetings, except with the special permission of the Secretary, unless specially permitted by the regulations or as horticultural sundries. Miniature gardens in which the container is of more importance than the plants may only be shown as sundries.

Pictures and photographs of plants, flowers, and gardens, and plans and models of gardens, may be exhibited at the Society's Fortnightly Shows during November, December, January and at the first Show in February. Only works which are definitely of horticultural or botanical interest are invited. Paintings of flowers should be at least life-size; miniatures are unsuitable for the Society's exhibitions. Pictures executed in needlework or modelled in paper, and all fanciful or fancy-work objects pictures, calendars, Christmas cards and similar objects are also unsuitable and may not be shown. No awards will be made at Fortnightly Shows for exhibits of plans, or photographs or models of gardens. Sundries may be shown in the Halls during December and January. As in 1939 there is only one Show in December, sundries will be admitted on November 28, if space permits. Sundries may also be exhibited at the Great Spring Show at Chelsea. Only sundries of a distinctly horticultural nature may be shown. Raffia in the form of dolls or other fancy figures, pot-pourri, scent, ladies' smocks, or embroidered or other fancy aprons are not regarded as horticultural.

Only actual exhibitors, and such assistants as may be necessary for the arrangement of the exhibits, will be admitted before the exhibition is opened to the public. All persons, except such as may be retained by the Society, must retire at the time fixed for judging. Exhibitors' passes will be issued when necessary. Photographs may be taken at the Society's exhibitions only by those holding photography-permits issued by the Secretary. Smoking is strictly prohibited in the Halls during the hours of the exhibitions.

After judging has taken place, nothing exhibited may be altered or removed until the close of the Show, except by permission of the Secretary. This does not apply to faded flowers, which should be replaced. Nothing exhibited may be removed from the Meetings until after the time of closing without special permission in writing. Exhibitors are forbidden to sell plants, flowers, fruit, vegetables or other articles for removal during the Meeting. The door-keepers have instructions to see that this rule is observed. In order not to deter the owners of new or special plants from submitting them to the Committees for award, the Council has decided that written application may be made to the Secretary for leave to remove such plants at 5 P.M. on the first day of any two-day Meeting at the Society's Hall. The Council hopes that sparing use will be made of this privilege, and that application will be made only in cases of urgent necessity. Nothing may be removed from an exhibit under this regulation until the written application has been signed by the Secretary. All goods must be removed from the Halls by 9 o'clock on the evening the Show closes, unless special arrangements have been made with the Secretary. Anything left on the premises remains there at the owner's sole risk.

All exhibits, personal property, etc., shall be at the risk of the exhibitors, and the Society shall not be liable for compensation for loss or damage by theft, fire, water, accident, the requirements of the London County Council, or any other cause whatsoever. Should a Show from any cause not be held, no exhibitor shall have any claim on the Society or its officers for loss, damage, interest, or compensation. Exhibitors will be wholly responsible for any claim made by their employees under the Employers' Liability Acts or the Workmen's Compensation Act, etc. The Society has no responsibility to any but its own employees.

THE COMMITTEES AND THEIR WORK.

COMMITTEES are appointed annually to meet in connexion with the Society's Shows and other activities. Some are nominated entirely by the Council, while others are appointed jointly by the Council and the governing bodies of allied societies. One of the principal objects of these Committees is to encourage the introduction of new species of plants and the production of new and improved varieties of decorative plants, flowers, fruits and vegetables, by examining and reporting upon such as may be submitted either at exhibitions or for trial. Awards are made by the Council to meritorious objects upon the recommendations of these Committees. Another function of the Committees is to collect and disseminate information about plants, flowers, fruits, vegetables and other objects of horticultural interest, including information regarding the classification and nomenclature of garden plants, and the incidence and control of diseases and pests. Certain Committees report upon the merits of non-competitive exhibits staged in the Exhibition Halls at Fortnightly Shows, and awards made by the Council are based largely on the Committees' recommendations.

In connexion with the submission of new plants to the Committees for certificate or for selection for trial, each plant must be entered with the Secretary of the appropriate Committee, who will say where the plant should be placed. Forms for this purpose may be obtained from the Society's Office before the Committee Meetings, or from the Secretaries of the Committees on the mornings of the Committee Meetings. All plants submitted to the Committees should be named as a means of future identification. If the exhibitor believes that the plant has a name, although it is unknown to him, the words " Name unknown " should be written on the entry form in the place provided for the name, and the Committee will then endeavour to identify the plant. If the plant is of garden origin, it should be named by its owner or raiser before it is submitted to the Committee. The names must conform to the Rules of Nomenclature adopted at the International Horticultural Congresses (see p. 40). No award will be made to anything without a name. If the naming is in doubt, the award may be made subject to the verification of the name, and if the proposed name does not conform to the Rules of Nomenclature, any award made will be subject to the alteration of the name. Exhibitors are particularly requested to supply the information required by the entry form, and also any additional particulars which they may think interesting for publication. They will also greatly facilitate the work of the Committees by sending specimens of well-known varieties for comparison.

In considering a new plant it is laid down—(*a*) that no recommendation for an award to a plant shall be made to the Council unless at least six members vote for it; (*b*) that no recommendation for a First Class Certificate shall be made unless the number of votes cast in favour of it is at least three times the number cast against it; (*c*) that no recommendation for any other award shall be made unless the number of votes cast in favour of it is at least double the number recorded against it; and (*d*) that while the merits of an exhibit shown by a member of the Committee, or in which any member of the Committee is professionally interested, are under discussion, the member concerned must withdraw and not take part in the voting.

Specimens of plants that have received awards or that have been selected for trial will be placed on the New-Plant Stand in the Hall. Exhibitors entering new plants before the Committees must understand before doing so that if the variety is selected for trial, they tacitly agree to send the number of plants or seeds of it required for trial the following year, and that if any award is made, they give their consent to the object being painted or photographed for the Society.

THE NAMING OF PLANTS.

NAMES are given to plants so that when they are spoken or written about there may be no confusion as to the particular plant referred to. Every plant must therefore bear one name only, which must be universally accepted.

At the International Horticultural Conferences of London in 1930, Paris in 1932, and Rome in 1935, the nomenclature of garden plants was fully discussed and general agreement was reached on most matters that relate to the naming of garden plants. A few modifications have been introduced as a result of the Conference in Berlin in 1938.

The principles governing the naming of plants by botanists were accepted as the basis for the naming of plants of garden origin, these principles being:—

1. A plant can bear but one valid name.
2. The valid name is the earliest which conforms to the accepted Rules of Nomenclature.

Names of species and botanical varieties are framed according to the Rules of Botanical Nomenclature agreed at the Botanical Congress of Vienna in 1905 and revised at the Congresses of Brussels in 1910, Cambridge in 1930, and Amsterdam in 1935.

Briefly, the botanical name of a species consists of two words of Latin form. The first is that of the genus to which the plant belongs, written with an initial capital letter; the second, the earliest specific name given by Linnæus in 1753 or by botanists subsequently, so long as it conforms with the rules, written usually with a small initial letter (e.g. *Berberis aggregata*). A capital initial letter is, however, given where specific names are derived from names of persons (but not places) (e.g. *Berberis Wilsonae, Campanula Allionii*) or are those of old genera (e.g. *Crataegus Oxyacantha, Ranunculus Flammula*). The Paris Conference recommends that for horticultural purposes all specific names should be written with a small initial letter.* The gender of the specific name is the same as that of the genus (e.g. *Ranunculus parnassifolius, Primula japonica, Arum maculatum,* but most trees are regarded as feminine, so *Quercus sessiliflora* and *Fagus sylvatica* are correct).

For a full discussion of these botanical names the " Rules " should be consulted.

In order to obtain uniformity in the use of generic names, a list of the genera which are sometimes divided by botanists has been drawn up and recommendations are made as to the name to be retained in horticulture. These names are chosen in conformity with the Rules and apply only where differences of treatment are given by botanists. At the Horticultural Congress in Rome in 1935 a list of specific names of plants of horticultural interest was agreed for international use for the ensuing six years and, in addition, certain lists of names of garden varieties were also adopted as standards for future use.

Names of botanical varieties follow the name of the species to which they belong. Thus, *e.g.*, the botanical varieties of *Narcissus triandrus* would be *Narcissus triandrus* var. *albus*, *N. triandrus* var. *calathinus*, *N. triandrus* var. *concolor*, and so on. These varietal names follow the same rules as specific names.

Names of species and botanical varieties are thus fully provided for.

Plants raised in gardens as seedlings or sports of these species or as hybrids between species often have to be named by non-botanical people, and the following rules, agreed to at the International Horticultural Conferences of London, Paris and Berlin, are for their guidance. They are based on the principles and rules which have been briefly outlined.

(*a*) The name of a horticultural variety should be placed after that of the species to which it belongs, and its status should, or may, be indicated by the contraction " var." Examples are given below.

(*b*) The varietal name should be of Latin form only when it expresses some character of the plant, e.g. *nanus, fastigiatus, albus,* or its place of origin, e.g. *kewensis*. [This rule holds only till Dec. 31, 1938. See (*c*).]

The use of Latin proper names for horticultural varieties is not permissible, e g. *Iris pallida Smithii* would be an inadmissible name for a garden variety.

(*c*) The name will thus usually (always if given after Jan. 1, 1939) be a " fancy " name, beginning with a capital letter, e.g. *Galega officinalis* var. ' George

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* This recommendation follows the practice of zoologists in naming animals. For the present the Society thinks it better to follow the recommendation in the " Rules of Botanical Nomenclature " in its own publications.

Hartland,' not *Galega officinalis* var. *Hartlandii*; *Dianthus deltoides* var. 'Brilliant,' not *Dianthus deltoides* var. *brilliantissimus*; Pea 'Masterpiece.'

(*d*) Varietal names must not be translated when transferred from other languages, but must be preserved in the language in which they were originally described. Where desirable a translation may be placed in brackets after the varietal name.

(*e*) As far as possible names of horticultural varieties should consist of a single word; the employment of not more than three words is permitted as a maximum.

(1) A varietal name in use for one variety of a kind of plant should not be used again for another variety of that kind, even though it may be attached to a different species.

That is, the use of the name *Narcissus Pseudonarcissus* 'Victoria' should preclude the use of 'Victoria' as a varietal name for any other species of Narcissus, such as *Narcissus poeticus* 'Victoria.' Similarly, there should be but one Iris 'Bridesmaid,' one Plum 'Superb' and so on.

(2) Varietal names likely to be confused with one another should be avoided. For instance, the use of the name 'Alexander' should preclude the use of 'Alexandra,' 'Alexandria,' and 'Alexandrina' as varietal names for the same kind of plant.

(3) Where personal names are used to designate varieties, the prefixes "Mr.," "Mrs.," "Miss," and their equivalents should be avoided.

(4) Excessively long words and words difficult to pronounce should be avoided in coining varietal names.

(5) The articles "a" and "the" and their equivalents should be avoided in all languages when they do not form an integral part of a substantive, *e g.* 'Colonel,' not 'The Colonel'; 'Giant,' not 'The Giant'; 'Bride,' not 'The Bride.'

(6) Existing names in common use should not be altered to conform to these rules, but attention should be paid to them in all new names proposed.

(*f*) The names of horticultural hybrids are formed in the same way as those of horticultural varieties (see paras. *a*–*e*).

[Hybrids are indicated by the multiplication sign × placed before the name of the hybrid.]

(*g*) The "genus" of bigeneric hybrids (*i.e.* hybrids between species of two different genera) is designated by a formula showing the parent genera in alphabetical order, and where necessary by a name compounded of the names of both genera, e.g. *Laeliocattleya*, *Urceocharis*, *Chionoscilla*.

(*h*) The "genus" of multigeneric hybrids (*i.e.* hybrids between species of three or more genera) is also designated by a formula and/or a conventional name, preferably that of a distinguished person to which is added the termination "*ara*," e.g. *Potinara*, *Vuylstekeara*. The names of trigeneric hybrids already in use, e.g. *Brassolaeliocattleya*, should be retained. All hybrids in which the same genera are combined receive the same generic name, no matter how they are combined, *e.g.* the same generic name would apply to all combinations of the genera *Brassavola*, *Cattleya*, *Epidendrum* and *Laelia*.

(*i*) All plants raised by crossing the same two species of plants receive the same specific name, variations between the seedlings being indicated where necessary by varietal names framed as already described. In practice in cross-bred plants, the specific name is frequently omitted, *e.g.* Iris 'Ambassadeur.'

(*k*) In order to be valid, a name must be published.

(*l*) The publication of a name of a horticultural variety or hybrid is effected by a recognizable description, with or without a figure, in any language written in Roman characters, preferably in English, French, German, Italian or Spanish.

(*m*) The description must appear in a recognized horticultural or botanical periodical, or in a monograph or other scientific publication, or in a dated horticultural catalogue which must be deposited in the Library of the chief Horticultural Society of the country.

(*n*) The mention of a variety without description in a catalogue, or in the report of an exhibition, is not valid publication, even if a figure is given. It is desirable that descriptions of new varieties in horticultural catalogues should also be published in periodical horticultural papers.

SCIENTIFIC COMMITTEE, 1939.

The Scientific Committee reports upon diseases, pests, newly imported plants, first hybrids between species, curious plants, inventions and such other objects of horticultural interest and value as may be brought before it by Fellows and by other Committees of the Society, deals with the determination of doubtful plants and their correct nomenclature, and considers proposals and makes recommendations for Botanical Certificates and Certificates of Appreciation. Fellows are therefore strongly urged to send specimens, with explanatory notes, of any new plants, of attacks of insects or fungi, or of other similar troubles on which they would like to obtain the opinion of the Committee. As full reports as possible will be published in the Society's JOURNAL and forwarded to the senders. All communications should be addressed to "The Secretary of the Scientific Committee, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1," and must reach the Society's offices not later than 2 P.M. on the day of the Meeting.

In considering the recommendation of the Botanical Certificate, regard is paid to (a) the special botanical interest of the plant exhibited; and (b) the desirability of encouraging the introduction and exhibition of novelties, even though they may not be of immediate commercial value, nor of a specially decorative character. Peculiarity of morphological or anatomical construction, physiological endowments, or adaptation to varying conditions; novelty, whether of introduction or of cultural origin; geographical distribution; potential value for garden or economic uses are all matters to be taken into account.

CHAIRMAN.

BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

VICE-CHAIRMEN.

COTTON, A. D., O.B.E., F.L.S., The Herbarium, Royal Botanic Gardens, Kew.
WEISS, Prof. F. E., D.Sc., LL.D., F.R.S., F.L.S., Easedale, Woodway, Merrow, near Guildford, Surrey.

CHITTENDEN, F. J., F.L.S., V.M.H., R.H.S. Offices. (*Secretary.*)

ARKWRIGHT, Sir JOHN S., D.L., J.P., Kinsham Court, Presteign, Radnorshire.
ARMSTRONG, E. F., Ph.D., D.Sc., LL.D., F.R.S., 69 Barkston Gardens, S.W. 5.
BAKER, E. G., 3 Cumberland Road, Kew, Surrey.
BAKER, F. J., A.R.C.S., Fisherswood, Sharnal Street, Hoo, Rochester, Kent.
BAKER, W. G., The Botanic Garden, Oxford.
BALFOUR, F. R. S., M.A., D.L., J.P., V.M.H., 13 Collingham Gardens, S.W. 5.
BARKER, Prof B. T. P., M.A., University of Bristol Research Station, Long Ashton, Bristol.
BARNES, B. F., D.Sc., Ph.D., F.L.S., Department of Biology, Chelsea Polytechnic, Manresa Road, S.W. 3.
BESANT, J. W., Botanic Gardens, Glasnevin, Dublin.
BEWLEY, W. F., C.B.E., D.Sc., V.M.H., Experimental and Research Station, Cheshunt, Herts.
BLACKMAN, Prof. V. H., M.A., Sc.D., F.R.S., 17 Berkeley Place, S.W. 19.
BLAIR, K. G., D.Sc., F.R.E.S., British Museum (Natural History), Cromwell Road, S.W. 7.
CRANE, M. B., A.L.S., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
FRYER, J. C. F., O.B.E., M.A., F.R.E.S., Plant Pathological Laboratory, Milton Road, Harpenden, Herts.
GREEN, D. E., M.Sc., R.H.S. Gardens, Wisley, Ripley, Surrey.
GROVE, A., F.L.S., V.M.H., Branstone Lodge, 232 Kew Road, Kew, Surrey.
HALL, Sir DANIEL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W, 19.
HILL, Sir ARTHUR W., K.C.M.G., M.A., Sc.D., F.R.S., F.L.S., V.M.H., Royal Botanic Gardens, Kew, Surrey.

Hooper, Cecil H., F.L.S., F.S.I., Oxenturn, Wye, Kent.
Hurst, C. C., Sc.D., Ph.D., F.L.S., D.L., J.P., Broomhurst, Horsham, Sussex.
Jackson, A. Bruce, A.L.S., 3 The Avenue, Kew Gardens, Surrey.
Keeble, Sir Frederick, C.B.E., M.A., Sc.D., F.R.S., F.L.S., Cedron House, Fowey, Cornwall.
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Odell, J. W., 116 Welldon Crescent, Harrow, Middlesex.
Percival, Prof. J., M.A., Sc.D., F.L.S., Leighton, Shinfield, Reading, Berks.
Prain, Lieut.-Col. Sir David, C.M.G., C.I.E., LL.D., F.R.S., F.L.S., V.M.H., The Well Farm, Warlingham, Surrey.
Preston, F G., V.M.H., University Botanic Garden, Cambridge.
Ramsbottom, J., O.B.E., M.A., Dr.Sc., Pres.L.S., British Museum (Natural History), Cromwell Road, S.W. 7.
Robinson, G. W, Chelsea Physic Garden, S.W. 3.
Russell, Sir E. John, D.Sc., F.R.S., Rothamsted Experimental Station, Harpenden, Herts.
Salisbury, Dr. E. J., F R.S., University College, Gower Street, W C. 1.
Salmon, Prof. E. S., F.L S., South-Eastern Agricultural College, Wye, Ashford, Kent.
Smith, Sir William Wright, M A., F.R.S.E., F.L.S., V.M.H., Royal Botanic Garden, Edinburgh 4.
Tincker, M. A. H., M.A., D Sc., F.L.S., R.H.S. Gardens, Wisley, Ripley, Surrey.
Wilson, G. F., F.L.S., F.R.E.S., N.D.H., R.H.S. Gardens, Wisley, Ripley, Surrey.
Wilson, Gurney, F.L S., c/o R H.S Offices.
Worsdell, W. C, 11 Westbourne House, Twickenham, Middlesex.
Worsley, A, J P., The Cliff, 3 Bath Road, Ventnor, I. of W.

Note.—Members of the Council are Members of this Committee, and Chairmen of Standing and Joint Committees are *ex-officio* members.

The Committee will meet at 4 P M. on the first day of all Fortnightly Meetings.

* * *

FRUIT AND VEGETABLE COMMITTEE, 1939.

CHAIRMAN.

Bunyard, E. A., F.L.S., Allington, Maidstone, Kent.

VICE CHAIRMEN.

Nix, C. G. A., V.M.H., Tilgate, Crawley, Sussex.
Secrett, F. A., F.L.S., V.M.H., Bell Farm, Felcott Road, Walton-on-Thames, Surrey.

Potter, J. M. S., R.H.S. Offices. (*Secretary.*)

Barnett, H. T., Westwood House, Tilehurst, Reading, Berks.
Basham, Joseph, Fairoak Nurseries, Bassaleg, near Newport, Mon.
Bostock, F., D.L., Pitsford House, Northampton
Bullock, A., 158 Northwood Way, Northwood Hills, Middlesex.
Cracknell, J. S., c/o Watkins & Simpson Ltd., 27 Drury Lane, Covent Garden, W.C. 2.
Crane, M. B., A.L.S., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
Divers, W. H., V.M H., Westdean, Hook, near Surbiton, Surrey.
Earl, W. J., Knowsley Gardens, Prescot, Lancs.
Falconer, A., Secretary's Office, Stamford Park, Stalybridge, Cheshire.
Giles, W. F., Furzebank, 38 Redlands Road, Reading, Berks.
Hall, H. J., The Gardens, Harewood, near Leeds.
Hall, R. H., The Gardens, Hatfield House, Hatfield, Herts.
Holloway, W. H., The Gardens, Tewin Water, Welwyn, Herts.
Jordan, F., V.M.H., Yewdene, Edenbridge, Kent.
Kelf, Geo., 140 Ivy Road, Cricklewood, N W. 2.
Laxton, E. A. L., V.M.H., 63 High Street, Bedford.
Lobjoit, Sir William G., O.B.E., J.P., V.M.H., Oakdene, Wooburn, High Wycombe, Bucks.
Markham, H., Wrotham Park Gardens, Barnet, Herts.
Metcalfe, A. W., Rozel, Hatfield Road, St. Albans, Herts.
Middleton, C. H., 17 Princes Avenue, Surbiton, Surrey.

Modral, W. C., The Gardens, Old Warden Park, Biggleswade, Beds.
Neal, E., The Gardens, Tilgate, Crawley, Sussex.
Neame, Thomas, The Offices, Macknade, Faversham, Kent.
Prince, H., 119 St Peter's Road, Earley, Reading, Berks.
Rawes, A. N., c/o T. Rivers & Son, Ltd., The Nurseries, Sawbridgeworth, Herts.
Richards, J. M., The Gardens, Gatton Park, Reigate, Surrey.
Smith, A. C., The Green Farm, Shillington, near Hitchin, Herts.
Streeter, F., The Gardens, Petworth Park, Sussex.
Taylor, H. V., O.B.E., D.Sc., V.M.H., Ministry of Agriculture and Fisheries, S.W. 1.
Tomalin, T E., The Gardens, Stansted Park, Rowlands Castle, Hants.
Tuckett, P. **Debell**, 17 Phillimore Place, Kensington, W. 8.
Weston, J. G., The Gardens, Chatsworth, Bakewell, Derbyshire.
Wilson, James, The Gardens, Trent Park, New Barnet, Herts.
Woodward, J. G., Teston, Maidstone, Kent.

Note.—Members of the Council are Members of this Committee.

The Committee will meet:

at 12 noon on the first day of all Fortnightly Meetings, and at the Early Market Produce Show, Thursday, April 13; and at 10.30 a.m. on Tuesday, May 16, at Chelsea.

Entries at Chelsea Show must be handed in by 10.15 a.m. on Tuesday, May 16; at other meetings by 11.30 a.m.

All fruits for certificates must be ripe or in such a condition that their quality may be estimated. To permit a correct description being drawn up, a sufficient sample must be sent for tasting, together with leaves (if available), and a small branch to show the growth. Of apples, pears, peaches, nectarines, apricots, and plums—not fewer than nine must be sent; of damsons and bullaces—thirty fruits; of cherries and raspberries—fifty fruits; of strawberries—twenty fruits; of gooseberries—thirty fruits; of red and white currants—thirty bunches; of black currants—one pound; of nuts—one pound; of tomatos—two plants in fruit. Details of the origin and chief characteristics of the variety, together with the age of the tree, must be given on the entry form. In the case of peaches and nectarines, the size of the flowers must be stated.

A First Class Certificate can only be awarded to a variety which has received an Award of Merit, and when its growth and cropping habits are known to several Members of the Committee. If necessary, the Chairman will appoint a Committee of three to inspect and report upon the growing tree. Promising varieties of hardy fruits are recommended for the trials for commercial purposes at Wisley.

Awards are not made to the following plants until their cropping qualities and distinctive merits have been ascertained by trial at Wisley:—Beans, Brassicas, Cucumbers, Melons, Peas, Potatos, Tomatos, and similar fruits and vegetables. Awards are not recommended in London to plants which can be, and usually are, raised each year from seed and brought to maturity within a year from the sowing of the seed Nor are awards recommended independently in London to plants which are usually perpetuated by seed if the class to which they belong is under trial at Wisley, has been tried in the previous year, or is on the Trials Calendar for the ensuing year. Awards to plants commonly grown from seed each year are given to the strain and not to the individual plants.

* * *

FLORAL COMMITTEE A, 1939.

Floral Committee A deals with Florists' Flowers and Plants, except Orchids, Narcissi and Tulips, Dahlias, Delphiniums, Early-flowering Chrysanthemums, Irises, Perpetual-flowering and Border Carnations and Picotees, Sweet Peas. For these see the Special or Joint Committees.

CHAIRMAN.

Leak, G. W., V.M.H., Flint House, Lynn Road, Wisbech, Cambs.

VICE-CHAIRMEN.

Ingamells, D., 27 Catherine Street, Covent Garden, W.C. 2.
Oldham, W. R., J.P., V.M.H., Chimney Close, Windlesham, Surrey.

Cartwright, W. D., R.H.S. Offices. (*Secretary.*)

Allan, D., c/o Dobbie's Seed Farms, Marks Tey, Essex.
Allwood, M. C., F.L.S., Wivelsfield Nurseries, Haywards Heath, Sussex.
Armstrong, W. F., Supt.'s Office, Gunnersbury Park, Acton, W. 3.
Austin, W., Supt.'s Office, Greenwich Park, S.E. 10.
Campbell, D., New Lodge, Inner Circle, Regent's Park, N.W. 1.
Cobb, A. J., St. Kenelm, 55 Northcourt Avenue, Reading, Berks.
Crane H. H., Highmead, Cheney Lane, Eastcote, Pinner, Middlesex.
Darlington, H. R., M.A., LL.M., F.L.S., V.M.H., Park House, Potters Bar, Middlesex.
Dawkins, A., c/o Alfred Dawkins (Chelsea), Ltd., 408 King's Road, Chelsea, S.W. 10.
Dickson, **Hugh**, c/o T. Cullen & Sons, Witham, Essex.
Engelmann, C., Saffron Walden, Essex.
Hay, R. E., New Lodge, Hyde Park, W. 2.
Janes, E. R., 12 Brooklyn Drive, Emmer Green, Reading, Berks.
Langdon, C. F., V.M.H., Twerton Hill Nursery, Bath, Somerset.
Page, **Courtney**, 117 Victoria Street, S.W. 1.
Riding, **Jas.** B., The Nurseries, Chingford, E. 4.
Robinson, G. W., Chelsea Physic Garden, S.W. 3.
Simmons, D. W., The Nurseries, Harpenden Road, St. Albans, Herts.
Smith, Mrs. **Lindsay**, Postford House, Chilworth, Surrey.
Tracey, Mrs. I. A., High Hall, Wimborne, Dorset.
Trotter, Mrs. R. D., Leith Vale, Ockley, Surrey.
Wells, **Ben**, Hardy Plant Nurseries, Merstham, Surrey.
West, J T., Tower Hill, Brentwood, Essex.
Wilkin, H. T., c/o Carters Tested Seeds, Ltd., Raynes Park, S.W. 20.

Note.—Members of the Council are Members of this Committee.

The Committee will meet:

at 12.15 p.m. on the first day of all Fortnightly Meetings, and at Chelsea on Tuesday, May 16.

Entries must be handed in to the Secretary of the Committee by 10.15 a.m. at Chelsea, and by 11.45 a.m. on all other occasions when the Committee meets.

The number of specimens required varies according to the heading under which an award is sought, for an award as a show flower, at least three open blooms (except for Hippeastrum or Nerine, where one only is required), either cut or on a plant or plants, must be shown; for an award as a variety for cutting or for market, at least sufficient cut flowers to fill a vase, and in the case of a rose or chrysanthemum, a plant in bloom, for an award as an ornamental pot-plant, at least three plants in pots, one of which, in the case of a chrysanthemum, must be shown without any disbudding, while the other two should be somewhat disbudded; for an award as a bedding plant, one plant will usually be sufficient; and for an award as a variety for the herbaceous border in all practicable cases at least one growing plant will be required, but cut specimens, if sufficient, will be admissible when the habit of the plant is well known.

The following florists' flowers and plants are given awards (except Preliminary Commendation) only after trial at Wisley:—Anemone (Japanese), Aster (Michaelmas Daisy), Aubrietia, Alpine Auricula, Chrysanthemum (early flowering, for garden decoration), Cistus, Clematis, Dianthus (Pinks), Fuchsia, Gladiolus (for cutting or garden decoration), Helianthemum, Hemerocallis, Kniphofia, Lobelia (hardy hybrids), Lupinus (perennial), Phlox (herbaceous and alpine), Primrose, Pyrethrum, Scabiosa caucasica, Sidalcea, Veronica (herbaceous), Viola. When any of these plants are submitted to the Committee in London, and considered worthy, they are selected for trial at Wisley.

No award, except Preliminary Commendation, is recommended in London to plants which can be, and usually are, raised each year from seed and flowered within a year from the sowing of the seed; and no award, except Preliminary Commendation, is recommended independently in London to plants which are usually perpetuated by seed if the class to which they belong is under trial at Wisley, has been tried in the previous year, or is on the Trials Calendar for the ensuing year. All plants which receive Preliminary Commendations under this regulation are selected for trial at Wisley. Awards to plants commonly grown from seed each year are given to the strain and not to individual plants.

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FLORAL COMMITTEE B, 1939.

Floral Committee B deals with Plants other than Florists' Flowers and Plants, except Orchids other than hardy terrestrial kinds, Narcissi and Tulips, Dahlias, Delphiniums, Irises, Rhododendrons, Rock-garden and Alpine-house Plants. For these see Special or Joint Committees.

CHAIRMAN.

Musgrave, C. T., V.M.H., Olivers, Hascombe, Godalming, Surrey.

VICE-CHAIRMEN.

Aberconway, Lord, C.B.E., V.M.H., 38 South Street, Mayfair, W. 1.
Bean, W. J., C.V.O., I.S.O., V.M.H., 2 Mortlake Road, Kew, Surrey.
Bowles, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

Gould, N. K., R.H.S. Offices. (*Secretary.*)

Baker, G. P., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks, Kent.
Baker, W. G., The Botanic Garden, Oxford.
Balfour, A. P., c/o Sutton & Sons, Ltd., Seed Trial Grounds, Slough, Bucks.
Bowes-Lyon, The Hon. David, St. Paul's Waldenbury, Hitchin, Herts.
Byng of Vimy, The Viscountess, Thorpe Hall, Thorpe-le-Soken, Essex.
Campbell, W. M., Royal Botanic Gardens, 197 Kew Road, Kew, Surrey.
Clarke, Col. Stephenson R., C.B., J.P., LL.D., V.M.H., Borde Hill, Haywards Heath, Sussex.
Comber, J., V.M.H., The Gardens, Nymans, Handcross, Sussex.
Coutts, J., M.B.E., V.M H., Lasswade, Green Meads, Westfield, Woking, Surrey.
Cranfield, W. B., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex.
Devonshire, His Grace The Duke of, 2 Carlton Gardens, S.W. 1.
Elliott, Clarence, Six Hills Nursery, Stevenage, Herts.
Fenwick, Mark, J.P., V.M.H., Abbotswood, Stow-on-the-Wold, Glos.
Hamilton, The Marquess of, 22 Cambridge Square, W. 2.
Hay, T., M.V.O., V.M.H., New Lodge, Hyde Park, W. 2.
Higgins, Mrs. V., 28 Northampton Road, Croydon, Surrey.
Ingwersen, W. E. Th., Birch Farm Hardy Plant Nursery, Gravetye, East Grinstead, Sussex.
Jenkinson, Capt. R. C. H., The White House, Windlesham, Surrey.
Lawrence, Lady, Riverdale, Dorking, Surrey.
Marsden-Jones, E. M., F.L.S., The Potterne Biological Station, Devizes, Wilts.
Ogilvie-Grant, Mark, The Larches, Iver Heath, Iver, Bucks.
Oldham, W. R., J.P., V.M.H., Chimney Close, Windlesham, Surrey.
Palmer, The Hon. Lewis, 14 Buckingham Palace Gardens, S.W. 1.
Perry, Amos, V.M.H., Hardy Plant Farm, Enfield, Middlesex.
Preston, F. G., V.M.H., University Botanic Garden, Cambridge.
Reuthe, G., V.M.H., Sunnycroft, 109 Crown Lane, Bromley, Kent.
Rosenheim, Paul, 27 Spencer Road, East Molesey, Surrey.
Rosse, The Earl of, Birr Castle, King's Co., Ireland.
Russell, L. R., V.M.H., Richmond Nurseries, Windlesham, Surrey.
Stanley, The Lady Beatrix, C.B.E., C.I., Sibbertoft Manor, Market Harborough, Leicestershire.
Stern, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.
Stoker, Dr. Fred, F.L.S., V.M.H., The Summit, Golding's Hill, Loughton, Essex.
Strathcona and Mount Royal, Lord, 14 South Audley Street, W. 1.
Trotter, R. D., Leith Vale, Ockley, Surrey.
Wallace, R. W., J.P., V.M.H., The Old Gardens, Tunbridge Wells, Kent.
Wilding, E. H., Wexham Place, Stoke Poges, Bucks.
Williams, C., M.P., 59 Tufton Street, Westminster, S.W. 1.

Note.—Members of the Council are Members of this Committee.

The Committee will meet:

at 12 noon on the first day of all Fortnightly Meetings; and at 12.15 p.m. on Tuesday, May 16, at Chelsea.

Entries must be handed to the Secretary of the Committee by 10.15 A.M. at Chelsea and by 11.30 A.M. on all other occasions when the Committee meets.

The number of specimens required varies according to the heading under which an award is sought: for an award as a plant for bedding, at least one plant must be shown; for an award as a plant for the herbaceous border or as a plant for the water garden, a growing plant is required wherever practicable, but cut specimens, if sufficient, are admissible when the habit of the plant is well known; for an award as a plant for cutting, at least sufficient cut material to fill a vase must be shown.

No award, except Preliminary Commendation, is recommended in London to plants which can be, and usually are, raised each year from seed and flowered within a year from the sowing of the seed; and no award, except Preliminary Commendation, is recommended independently in London to plants which are usually perpetuated by seed if the class to which they belong is under trial at Wisley, has been tried in the previous year, or is on the Trials Calendar for the ensuing year. All plants which receive Preliminary Commendations under this regulation will be selected for trial at Wisley. Awards to plants commonly grown from seed each year are given to the strain and not to individual plants.

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ORCHID COMMITTEE, 1939.

The Orchid Committee deals with all Orchids, except hardy terrestrial species, for which see Floral Committee B.

CHAIRMAN.

COLMAN, Sir JEREMIAH, Bt., M.A., D.L., J.P., V.M.H., Gatton Park, Reigate, Surrey.

VICE-CHAIRMEN.

CLARKE, Col. STEPHENSON R., C.B., J.P., LL.D., V.M.H., Borde Hill, Haywards Heath, Sussex.
ROTHSCHILD, LIONEL DE, O.B.E., V.M.H., 18 Kensington Palace Gardens, W. 8

WILSON, GURNEY, F.L.S., c/o R.H.S. Offices. (*Hon. Secretary.*)

ALEXANDER, H. G., V.M.H., Woodlands, Westonbirt, Tetbury, Glos.
ARMSTRONG, T., Orchidhurst, Sandhurst Park, Tunbridge Wells, Kent.
ASHTON, E. R., Broadlands, Camden Park, Tunbridge Wells, Kent.
CONGREVE, AMBROSE, Moncorvo House, Ennismore Gardens, S.W. 7.
COOKE, Sir WILLIAM, Bt., Wyld Court, Hampstead-Norris, Newbury, Berks
COOKSON, CLIVE, Crescent House, Newcastle-upon-Tyne, 1.
CURTIS, C. H., F.L.S., V.M.H., 24 Boston Manor Road, Brentford, Middlesex.
ELLWOOD, A. G., c/o Charlesworth & Co., Ltd., Haywards Heath, Sussex.
FARMER, R. E., Orchid Dept., Dell Park, Englefield Green, Surrey.
FLORY, SIDNEY W., Orchid Nursery, Slough, Bucks.
HATCHER, W. H., Cragg Wood Nurseries, Rawdon, Leeds, Yorks.
HOLMES, Mrs. MARGOT A., 56 Avenue Road, Regent's Park, N.W. 8.
HURST, C. C., Sc.D., Ph.D., F.L.S., D.L., J.P., Broomhurst, Horsham, Sussex.
JAMES, The Hon. ROBERT, St. Nicholas, Richmond, Yorks.
LAWSON, HENRY P., Lynbrook, Knaphill, Woking, Surrey.
LOW, Miss W. E., Bush Hill Park, Enfield, Middlesex.
MCBEAN, A. A., Cooksbridge, Sussex.
MOORE, Dr. F. CRAVEN, Duckyls, near East Grinstead, Sussex.
MOORE, Sir FREDERICK W., M.A., F.L.S., V.M.H., Willbrook House, Rathfarnham, co. Dublin.
SANDER, FREDERICK K., The Camp, St. Albans, Herts.
SUMMERHAYES, V. S., B.Sc., The Royal Botanic Gardens, Kew, Surrey.
TUFTON, The Hon. HENRY S., Castle Hill, Englefield Green, Surrey.
WILSON, E. K., Cannizaro, Wimbledon, S.W. 19.

NOTE.—Members of the Council are Members of this Committee.

The Committee will meet:

at 11.45 A.M. on the first day of all Fortnightly Meetings; and at 12.15 P.M. on Tuesday, May 16, at Chelsea.

Entries at the Chelsea Show must be handed to the Secretary of the Committee by 10.15 A.M. and on all other days when the Committee meets by 10.30 A.M.

Usually a growing plant is required, but when the plant would have to be sent from abroad, or from such a great distance that its transport would be an unreasonable burden for the exhibitor, the Committee may regard a cut spike as sufficient.

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NARCISSUS AND TULIP COMMITTEE, 1939.

CHAIRMAN.

BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

VICE-CHAIRMEN.

CRANFIELD, W. B., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex.
LEAK, G. W., V.M.H., Flint House, Lynn Road, Wisbech, Cambs.
MONRO, GEORGE, C.B.E., V.M.H., 4 Tavistock Street, Covent Garden, W.C. 2.

SIMMONDS, A., R.H.S. Offices. (*Secretary.*)

ARKWRIGHT, Sir JOHN S., D.L., J.P., Kinsham Court, Presteign, Radnorshire.
BARR, HERBERT R., c/o Barr & Sons, 11/13 King Street, Covent Garden, W.C. 2.
BERKELEY, R. G., Spetchley Park, Worcester.
BRODIE OF BRODIE, Mrs., O.B.E., Brodie Castle, Forres, N.B.
COBLEY, R. SEYMOUR, 4 Bridgeland Street, Bideford, N. Devon.
COPELAND, W. F. M., West View, 156 St. James Road, Southampton.
COWEN, A., c/o J. R. Pearson & Sons, Ltd., Lowdham, Notts.
CURTIS, C. H., F.L.S., V.M.H., 24 Boston Manor Road, Brentford, Middlesex.
DARNLEY, The Earl of, Cobham Hall, Cobham, Kent.
FARROW, A. E., Holbeach St. Marks, Holbeach, Lincs.
FITZHERBERT, Sir WILLIAM, Bt., Tissington Hall, Ashbourne, Derbyshire.
GRAY, ALEC, Penpol, Devoran, Truro, Cornwall.
HALL, Sir DANIEL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
HAWKER, Capt. H. G., M.A., Strode, Ermington, S. Devon.
JOHNSTONE, G. H., Trewithen, Grampound Road, Cornwall.
MEYER, Rev. Canon ROLLO, Manor End, Little Gaddesden, Berkhamsted, Herts.
RICHARDSON, J. LIONEL, Prospect House, Waterford, Ireland.
SECRETT, F. A., F.L.S., V.M.H., Bell Farm, Felcott Road, Walton-on-Thames, Surrey.
SLINGER, W., c/o Donard Nursery Co., Newcastle, co. Down, Ireland.
SMITH, H., Marken, 398 Wake Green Road, Moseley, Birmingham.
STANLEY, The Lady BEATRIX, C.B.E., C.I., Sibbertoft Manor, Market Harborough, Leics.
STERN, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.
TITCHMARSH, C. C., N.D.H., Barrow, Englishcombe, Bath, Somerset.
WHITE, A. W., c/o J. T. White & Sons, Ltd., Daffodil Nurseries, Spalding, Lincs.
WILLIAMS, A. M., Werrington Park, Launceston, Cornwall.
WILLIAMS, M. P., Lanarth, St. Keverne, R.S.O., Cornwall.
WILSON, GUY L., The Knockan, Broughshane, co. Antrim, Ireland.
WORMALD, HUGH, Heathfield, Dereham, Norfolk.

NOTE.—Members of the Council are members of this Committee.

The Committee will meet:

at 11 A.M. on the first day of all Fortnightly Meetings during February, March, April, and May; at 12 NOON at the Daffodil Show on Thursday, April 13; and at 11.15 A.M. on Tuesday, May 16, at Chelsea.

Entries must be handed in to the Secretary of the Narcissus and Tulip Committee by 11 A.M. at the Daffodil Show; by 10.15 A.M. at the Chelsea Show; and by 10.30 A.M. on other occasions when the Committee meets.

The number of specimens required varies according to the award sought. For a Preliminary Commendation as a show daffodil, one stem is sufficient, but for an Award of Merit nine stems are required, and for a First Class Certificate eighteen. To be selected for trial at Kirton as a variety for cutting, or for trial at Kirton or Gulval as a variety for cutting from the open for market, twenty-four stems of daffodil must be shown. In order to be selected for trial at Kirton as a daffodil for garden decoration twelve stems are sufficient. For an Award of Merit as a daffodil for cultivation in pots, pans, or bowls, two pots, pans or bowls, each with not fewer than three bulbs, must be shown, and four pots, pans or bowls are required for a First Class Certificate. Not fewer than twelve bulbs, growing in one or more than one pot, bowl or box, must be shown in order that a daffodil may obtain any award as a variety for forcing for market. Directions regarding the vases to be used for daffodils are given on the entry forms. Of a tulip shown as a variety for garden decoration, six stems are sufficient to obtain a Preliminary Commendation, but not fewer than twelve must be shown for an Award of Merit or a First Class Certificate. When staged as a tulip for forcing at least twelve plants must be exhibited as grown in not fewer than two pots, pans, bowls or boxes. A species or variety of species of tulip may receive a Preliminary Commendation when only one stem is shown, but at least three stems are required for an Award of Merit or a First Class Certificate.

Trials of daffodils are carried out by the Holland County Council in co-operation with the Society at the Agricultural Institute and Experimental Station, Kirton, near Boston, Lincs. These trials are for varieties considered suitable for cutting, for cutting from the open for market or for garden decoration. Only varieties selected by the Narcissus and Tulip Committee at its meetings in London are grown in the trials at Kirton. Trials of varieties for cutting and for garden decoration are also conducted at Wisley. Trials of very early varieties considered suitable for cutting from the open for market are carried out by the Cornwall County Council in co-operation with the Society at the Experimental Station, Gulval, Penzance. Only very early varieties can be accepted for the trials at Gulval, and the Education Committee of the Cornwall County Council reserves the right to refuse any entry. Those who wish to send varieties for trial at Gulval should apply for entry forms to the County Horticultural Superintendent, County Hall, Truro. An award as a variety for cutting is usually given only after trial at Kirton or Wisley. An award as a variety for cutting from the open for market is usually given only after trial at Kirton or Gulval, but an award may be given to a variety which has been shown in London and favourably reported upon by an *ad hoc* Sub-Committee after examination of the variety whilst in bloom on the premises of the owner. An award as a variety for garden decoration is usually given to a daffodil only after trial at Kirton or Wisley, but it may be given to a tulip after examination of specimens exhibited in London.

In the interests of all concerned, it is very desirable that only registered names should be used for daffodils, and the Council appeals to all raisers, and to all who purchase stock of new varieties, to co-operate with the Society in its efforts to prevent the confusion which must inevitably arise if names are given without regard to those already in use. As soon as it is decided that a seedling is worth naming, and while the whole of the stock is in one person's hands, the proposed name should be submitted to the Secretary. Before choosing a name for submission for registration, the latest edition of The Classified List of Daffodil Names should be consulted. A registration fee of 1*s*. for each name should be sent with the application for registration.

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JOINT BORDER CARNATION AND PICOTEE COMMITTEE, 1939.

CHAIRMAN.

Bowes-Lyon, The Hon. David, St. Paul's Waldenbury, Hitchin, Herts.

Brown, F. C., R.H.S. Offices. (*Secretary*.)

R.H.S. Representatives.

Allwood, M. C., F.L.S., Wivelsfield Nurseries, Haywards Heath, Sussex.
Charrington, E., Ice Wood Cottage, Limpsfield, Surrey.
Fairlie, J., 17 Mayfield Road, Acton, W. 3.
Gibson, J. L., c/o Gibson (Cranleigh), Ltd., The Gardens, Cranleigh, Surrey.

National Carnation and Picotee Society's Representatives.

Gray, F. E., 14 Queen's Avenue, Woodford Green, Essex.
Keen, J. J., 54 The Avenue, Southampton.
Maxfield, S., 19B Stone Street, Gravesend, Kent.
Thain, R., Hilandale, Guildown Avenue, Guildford, Surrey.
Wilkinson, Capt. E. M., Fernbank, Denville, Havant, Hants.
Mustow, A. E., 10 Brinkley Road, Worcester Park, Surrey. (*Hon. Secretary*, National Carnation and Picotee Society.)

The Committee will meet at the following times:

at 11.30 A.M. on July 4 and 11; at 3 P.M. at the National Carnation and Picotee Society's Show on July 18; at 11.30 A.M. on July 25; and on notice at such other times as is necessary to deal with entries.

Entries must be handed to the Secretary of the Committee by 11.15 A.M. on any of the named dates, but when it is desired to submit a variety for certificate in any week for which a meeting has not been arranged, the completed entry-form must reach the Secretary of the Royal Horticultural Society, or the Secretary of the National Carnation and Picotee Society, by the Tuesday in the preceding week.

Of new varieties placed before the Joint Committee not fewer than two blooms must be shown. These varieties may be selected for trial at Wisley and/or receive Preliminary Commendation. For an Award of Merit for exhibition not fewer than three blooms must be shown, and for an Award of Merit for the garden not fewer than three blooms must be shown, and three plants must be growing in the trials at Wisley. A First Class Certificate will be awarded only to a variety which has received an Award of Merit in a previous year, and at least seven blooms must be shown. In all cases, whenever possible, a growing plant should also be shown.

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JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE, 1939.

CHAIRMAN.

MONRO, GEORGE, C.B.E., V.M.H., 4 Tavistock Street, Covent Garden, W.C. 2

BROWN, F. C., R.H.S. Offices. (*Secretary.*)

R.H.S. REPRESENTATIVES.

ALLWOOD, M. C., F.L.S., Wivelsfield Nurseries, Haywards Heath, Sussex.
CARTER, E. R., Valhalla, Hartswood Road, Brentwood, Essex.
COOK, L. J., 7 Drapers Road, Enfield, Middlesex.
ENGELMANN, C., Saffron Walden, Essex.
INGAMELLS, D., 27 Catherine Street, Covent Garden, W.C. 2.

BRITISH CARNATION SOCIETY'S REPRESENTATIVES.

JORDAN, F., V.M.H., Yewdene, Edenbridge, Kent.
MASON, L., c/o H. T. Mason, Ltd., Eton Lodge, Hampton Hill, Middlesex.
METCALFE, A. W., Rozel, Hatfield Road, St. Albans, Herts.
WALLACE, W. E., J.P., V.M.H., Poplar Farm, Eaton Bray, Dunstable, Beds.
WRIGHT, G. H., The Gardens, North Mymms Park, Hatfield, Herts.
ALESWORTH, F. W., 17 Avenue Road, Isleworth, Middlesex. (*Hon. Secretary,* British Carnation Society.)

The Committee will meet at the following times:

at 12 NOON at the British Carnation Society's Shows on March 28 and October 24, and at such other times as is necessary to deal with entries.

At the British Carnation Society's Shows entries must be handed to the Secretary of the Committee by 11.30 A.M. When it is desired to submit a variety for certificate at one of the Royal Horticultural Society's Fortnightly Shows, the completed entry-form must reach the Secretary of the Royal Horticultural Society or the Secretary of the British Carnation Society by the Tuesday in the preceding week.

To obtain an Award of Merit, at least three open blooms and one plant in bloom must be shown. No award will be made to a perpetual-flowering carnation until the Committee has seen it twice within two years, once between November 1 and March 31, and once between April 1 and October 31. The period of the year for the second exhibition must differ by at least five months from the first. A First Class Certificate may be awarded only to a variety which has previously received an Award of Merit, and only after the Committee has inspected plants in growth between November 1 and March 31. Raisers who wish to enter a variety for a First Class Certificate must notify the Secretary of the Royal Horticultural Society, or the Secretary of the British Carnation Society, so that arrangements may be made for a visit of the Committee.

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JOINT DAHLIA COMMITTEE, 1939.

Deals with all Dahlias.

CHAIRMAN.

Hay, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.

Cartwright, W. D., R.H.S. Offices. (*Secretary.*)

R.H.S. Representatives.

Armstrong, W. F., Supt.'s Office, Gunnersbury Park, Acton, W. 3.
Austin, W., Supt.'s Office, Greenwich Park, S.E. 10.
Cobb, A. J., St. Kenelm, 55 Northcourt Avenue, Reading, Berks.
Drayson, G. F., 23 Palmerston Road, Buckhurst Hill, Essex.
Fife, William, c/o Dobbie & Co., Ltd., Edinburgh 7.
Riding, Jas. B., The Nurseries, Chingford, E. 4.

National Dahlia Society's Representatives.

Alesworth, F. W., 17 Avenue Road, Isleworth, Middlesex.
Campbell, D., New Lodge, Inner Circle, Regent's Park, N W 1
Emberson, J., Green Hayes, Lindsey Street, Epping, Essex.
Ogg, Stuart, The Grove Nurseries, Swanley, Kent.
West, J. T., Tower Hill, Brentwood, Essex.
Gibbard, H. S, 65 Woodstock Road, Wembley, Middlesex. (*Hon. Secretary,* National Dahlia Society.)

The Committee will meet at the following times:

> at 11 A.M. at the Fortnightly Meetings on August 15 and 29, September 12 and 26, and October 10; and at 12.15 P.M. at the National Dahlia Society's Show on September 5.

Entries must be handed to the Secretary of the Committee at least half an hour before the time of meeting.

On any Show-day, when no meeting of the Joint Committee has been arranged, dahlias should be entered with the Secretary of Floral Committee A.

At least three open blooms must be shown. Awards "for exhibition" may be made at a Show in London, but all other awards are made only after trial at Wisley, and varieties considered worthy will be selected for trial when shown in London.

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JOINT DELPHINIUM COMMITTEE, 1939.

CHAIRMAN.

Hay, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2

VICE-CHAIRMAN.

Bowes-Lyon, The Hon. David, St. Paul's Waldenbury, Hitchin, Herts.

Brown, F. C., R.H.S. Offices. (*Secretary.*)

R.H.S. Representatives.

Armstrong, W. F., Supt's. Office, Gunnersbury Park, Acton, W. 3.
Campbell, D., New Lodge, Inner Circle, Regent's Park, N.W. 1.
Ingamells, D., 27 Catherine Street, Covent Garden, W.C. 2.
Janes, E. R., 12 Brooklyn Drive, Emmer Green, Reading, Berks.
Langdon, C. F., V.M.H., Twerton Hill Nursery, Bath, Somerset.
Oldham, W. R., J.P., V.M.H., Chimney Close, Windlesham, Surrey.
Smith, Mrs. Lindsay, Postford House, Chilworth, Surrey.
Wells, Ben, Hardy Plant Nurseries, Merstham, Surrey.

British Delphinium Society's Representatives.

Bishop, F. A., The Glade, Clewer Green, Windsor, Berks.
Carlile, T., Loddon Gardens, Twyford, Berks.
Docwra, Mrs. R. E., 31 Upper Brighton Road, Surbiton, Surrey.
Hill, C. F., Westover, Harlington Road, Hillingdon, Middlesex.

MACSELF, A. J., Domarin, Hamilton Road, Reading, Berks.
PHILLIPS, G. A., c/o Hewitt & Co., Ltd., The Nurseries, Stratford-on-Avon, Warwickshire.
ROBERTS, S. HALFORD, 85–86 New Bond Street, W. 1.
MOIR, A. J., 3 Warwick Road, Thornton Heath, Surrey. (*Hon. Secretary,* British Delphinium Society.)

The Committee will meet at the following times:

at 11 A.M. at the Fortnightly Meetings on June 6 and 20 and July 4 and 18; at 11 A.M. on June 13 and July 11 if necessary to deal with entries; and at 12.15 P.M. at the British Delphinium Society's Show on Friday, June 23.

At Fortnightly Meetings and at the British Delphinium Society's Show entries must be handed to the Secretary of the Committee at least half an hour before the meeting. If it is desired to submit a variety for certificate on June 13 or July 11, the completed entry-form must reach the Secretary of the Royal Horticultural Society or the Secretary of the British Delphinium Society by the Tuesday in the preceding week.

On any Show-day, when no meeting of the Joint Committee has been arranged, delphiniums should be entered with the Secretary of Floral Committee A.

When exhibited as a variety for show purposes, or as a variety for garden decoration, at least three spikes of flowers, either cut or on a plant or plants, are required, and when staged as a variety for cutting, sufficient cut spikes of flowers to fill a vase must be shown.

An award as a variety for garden decoration, or as a variety for cutting, is made only after trial at Wisley. Varieties submitted to the Committee at Shows, and considered worthy, are selected for trial.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE FOR 1939.

CHAIRMAN.

LEAK, G. W., V.M.H., Flint House, Lynn Road, Wisbech, Cambs.

BROWN, F. C., R.H.S. Offices. (*Secretary.*)

R.H.S. REPRESENTATIVES.

ARMSTRONG, W. F., Supt.'s Office, Gunnersbury Park, Acton, W. 3.
CAMPBELL, D., New Lodge, Inner Circle, Regent's Park, N.W. 1.
CRANE, H. H., Highmead, Cheney Lane, Eastcote, Pinner, Middlesex.
CURTIS, C. H., F.L.S., V.M.H., 24 Boston Manor Road, Brentford, Middlesex.
INGAMELLS, D., 27 Catherine Street, Covent Garden, W.C. 2.
THISTLETHWAITE, E. T., 83 Chesterfield Road, Barnet, Herts.
THORPE, A. W., South View, Birmingham Road, Lichfield, Staffs.
WOOLMAN, J., Sandy Hill Nursery, Shirley, Birmingham.

NATIONAL CHRYSANTHEMUM SOCIETY'S REPRESENTATIVES.

AVERY, W., Henham Nursery, Henham, Bishops Stortford, Herts.
CRAGG, P. A., Capel, Hampers Lane, Storrington, Sussex.
DIXSON, W. H., Horsham Nursery, Broadbridge Heath, nr. Horsham, Sussex.
HAWES, E. F., Peace Villa, Woodcock Hill Lane, Kenton, Middlesex.
JOHNSON, T., The Nurseries, Tibshelf, near Alfreton, Derbyshire.
LUXFORD, KEITH, Sawbridgeworth, Herts.
STEVENSON, J. B., The Hawthorns, Cowley, Middlesex.
VINTEN, A. G., Oldland Nurseries, Balcombe, Sussex.
WARDMAN, W., 5 St. Augustine Street, Derby (*Secretary,* National Chrysanthemum Society.)

The Committee will meet at the following times:

at 11 A.M. on August 15, August 29, September 12, September 19, and September 26.

For purposes of the Joint Committee only chrysanthemums that flower in the open air before October 1 can be considered.

Varieties to be submitted to the Joint Early-flowering Chrysanthemum Committee must be entered on forms obtainable from the Secretary of the Royal Horticultural Society or the Secretary of the National Chrysanthemum Society beforehand, or from the Secretary of the Joint Early-flowering Chrysanthemum Committee on the morning of the Committee Meeting. The completed forms must be handed to the Secretary of the Committee by 10.45 A.M. on the meeting days.

The entry form must state whether the exhibitor wishes the variety to be judged:

(*e*) As a variety for Show purposes.
(*c*) As a variety for cutting.
(*m*) As a variety for market:
  (1) for growing in the open air.
  (2) for growing in pots.
(*p*) As an ornamental pot plant.
(*g*) As a variety for garden decoration.

An early-flowering chrysanthemum may be entered under more than one of these headings.

If at any Meeting of the Joint Early-flowering Chrysanthemum Committee a quorum is not present the varieties entered will be submitted to Floral Committee A, which will co-opt the members of the Joint Early-flowering Chrysanthemum Committee while the early-flowering chrysanthemums are being dealt with.

Preliminary Commendation will be given for any purpose. Awards under (*e*), (*m*) and (*p*) will be given to early-flowering chrysanthemums after examination of specimens exhibited at Shows. Awards under (*c*) and (*g*) will be given only after trial at Wisley. Varieties shown under (*c*) and (*g*), and considered worthy, will be selected for trial at Wisley.

Number of specimens required:

(*e*) For an award as a show flower:
  At least three blooms either cut or on a plant or plants.
(*m*) For an award as a variety for market:
  At least sufficient (and not fewer than six) cut blooms or sprays to fill a vase.

When an early-flowering chrysanthemum is submitted under this heading, a plant in bloom or bud in a pot or as lifted, as well as a vase of cut blooms, must be shown. A variety grown for the trial at Wisley may be selected by the Joint Committee as likely to be of value for market; the exhibitor of this variety need not then exhibit a plant.

(*p*) An award as an ordinary pot plant:
  At least three pots, not exceeding large 32's in size.

When an early-flowering chrysanthemum is submitted under this heading, plants must be shown either without any disbudding whatsoever or all disbudded. The number of plants in a pot is not restricted.

(*c*) and (*g*) To be selected for trial as a variety for cutting or for garden decoration:
  Not fewer than six cut blooms.

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JOINT IRIS COMMITTEE, 1939.

CHAIRMAN.

Stern, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.

VICE-CHAIRMEN.

Musgrave, C. T., V.M.H., Olivers, Hascombe, Godalming, Surrey.
Pilkington, G. L., Lower Lee, Woolton, Liverpool.

Brown, F. C., R.H.S. Offices. (*Secretary.*)

R.H.S. REPRESENTATIVES.

BOWES-LYON, The Hon. DAVID, St. Paul's Waldenbury, Hitchin, Herts.
BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.
CHRISTIE-MILLER, C. W., Swyncombe House, Henley-on-Thames, Oxon.
GALSWORTHY, FRANK, Green Lane Farm, Chertsey, Surrey.
LAWRENCE, Lady, Riverdale, Dorking, Surrey.
MEYER, Rev. Canon ROLLO, Manor End, Little Gaddesden, Berkhamsted, Herts.
PESEL, Miss L. F., The White House, Colebrook Street, Winchester.
WELLS, BEN, Hardy Plant Nurseries, Merstham, Surrey.

IRIS SOCIETY'S REPRESENTATIVES.

BAKER, G. P., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks, Kent.
BARR, G., c/o Barr & Sons, The Nurseries, Taplow.
BUNYARD, G. N., F.L.S., 10 Faraday Road, Maidstone, Kent.
HELLINGS, F. WYNN, Fleur de Lis, 41 Grove Way, Esher, Surrey.
LEVETT, Mrs. G. C., 29 Crescent Road, Kingston Hill, Surrey.
MURRELL, Mrs., c/o Orpington Nursery Co., Orpington, Kent.
PERRY, AMOS, V.M.H., Hardy Plant Farm, Enfield, Middlesex.
SPENDER, R. E. S., Chetwold, Yetminster, Dorset.
TOMALIN, F. W., 19 Gloucester Road, Hampton, Middlesex.
WALLACE, R. W., J.P., V.M.H., The Old Gardens, Tunbridge Wells, Kent.

The Committee will meet at the following times :

> at 12.45 P.M. on the first day of the Fortnightly Meetings on April 4 and 18, May 2, June 20, July 4 and 18; at 11.15 A.M. on Tuesday, May 16, at Chelsea, and at 2.15 P.M. at the Iris Society's Show on June 6.

Entries must be handed to the Secretary of the Committee by 10.15 A.M. at Chelsea and by 11.45 A.M. at all other meetings.

On any Show-day, when no meeting of the Joint Committee has been arranged, Irises should be entered with one of the Secretaries of the Floral Committees.

If an iris is shown with a view to its being selected for trial, one flowering stem is usually sufficient, but in order to obtain an award as a plant for general garden use, as a plant for the rock garden, or as a variety for market, not fewer than three flowering stems must be shown. When entered as a plant for the alpine house an Iris must be represented by a plant or plants carrying not fewer than three flowering stems in all and growing in a pot or pan, or pots or pans. If exhibited as an ornamental pot-plant the plants must be in pots.

Awards are made to species and first crosses between species when exhibited in London. Irises of garden origin (other than first crosses between species) may receive awards when exhibited in London, if considered suitable for the rock garden, alpine house, or for cultivation as ornamental pot-plants, but those which are entered as suitable for general garden use or for market, if considered worthy, are selected for trial at Wisley, a certificate of Preliminary Commendation being the only award for which they are eligible without trial.

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JOINT RHODODENDRON COMMITTEE, 1939.

CHAIRMAN.

STEVENSON, J. B., Tower Court, Ascot, Berks.

VICE-CHAIRMEN.

ABERCONWAY, Lord, C.B.E., V.M.H., 38 South Street, Mayfair, W. 1.
WILDING, E. H., Wexham Place, Stoke Poges, Bucks.

STYLE, M. G. H., R.H.S. Offices. (*Secretary.*)

R.H.S. REPRESENTATIVES.

BEAN, W. J., C.V.O., I.S.O., V.M.H., 2 Mortlake Road, Kew, Surrey.
BOLITHO, Col. E. H., D.S.O., Trengwainton, Heamoor S.O., Penzance, Cornwall.
CLARKE, Col. STEPHENSON R., C.B., J.P., LL.D., V.M.H., Borde Hill, Haywards Heath, Sussex.

Comber, J., V.M.H., The Gardens, Nymans, Handcross, Sussex.
Congreve, Ambrose, Moncorvo House, Ennismore Gardens, S.W. 7.
Digby, Lord, D.S.O., M.C., Minterne, Cerne Abbas, Dorset.
Hay, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.
James, The Hon. **Robert**, St. Nicholas, Richmond, Yorks.
Oldham, W. R., J.P., V.M.H., Chimney Close, Windlesham, Surrey.
Pinckney, G. H., c/o John Waterer, Sons & Crisp, Ltd., Bagshot, Surrey.
Reuthe, G., V.M.H., Sunnycroft, 109 Crown Lane, Bromley, Kent.
Wallace, R. W., J.P., V.M.H., The Old Gardens, Tunbridge Wells, Kent.
Williams, C., M.P., 59 Tufton Street, Westminster, S.W. 1.

RHODODENDRON ASSOCIATION'S REPRESENTATIVES.

Crosfield, J. J., Embley Park, Romsey, Hants.
Godman, Dame **Alice**, D.B.E., South Lodge, Horsham, Sussex.
Hutchinson, J., LL.D., F.L.S., The Herbarium, Royal Botanic Gardens, Kew, Surrey.
Jenkinson, Capt. R. C. H., The White House, Windlesham, Surrey.
Loder, Lady, Leonardslee, Horsham, Sussex.
Loder, Lt.-Col. **Giles**, H., M.C., High Beeches, Handcross, Sussex.
Rose, F. J., Townhill Park Gardens, West End, Southampton.
Rothschild, Lionel de, O.B.E., V.M.H., 18 Kensington Palace Gardens, W. 8.
Slocock, O. C. A., Goldsworth Old Nursery, Woking, Surrey.
Strathcona and Mount Royal, Lord, 14 South Audley Street, W. 1.
Walker-Heneage-Vivian, Admiral A., C.B., M.V.O., D.L., Clyne Castle, Blackpill, Swansea, Glamorgan.
Wilson, Gurney, F.L.S., c/o R.H.S. Offices. (*Secretary*, Rhododendron Association.)

The Committee will meet at the following times :

at 11.15 A.M. at the Fortnightly Meetings on February 21, March 11 and 21, April 4 and 18, June 6 and 20, July 4 ; at 12.15 A.M. at the Rhododendron Association's Show on May 2 ; and at 11.15 A.M. on Tuesday, May 16, at Chelsea.

Entries at the Chelsea Show must be handed to the Secretary of the Committee by 10.15 A.M. ; at other meetings at least half an hour before the meeting.

On any Show-day, when no meeting of the Joint Committee has been arranged, rhododendrons should be entered with the Secretary of Floral Committee B.

When shown as a plant for general garden use or as a plant for the greenhouse, a cut spray or truss is usually sufficient, but if possible a plant should be shown. At least one plant is required when a rhododendron is shown as suitable for the rock garden or alpine house, and in the latter case the plant must be growing in a pot or pan.

Trials of selected garden forms of azaleas, and of hardy hybrid rhododendrons, including azaleas, raised or shown by nurserymen, other than the results of first crosses made between species, are carried out at Wisley, and awards to these plants are made only after trial. All such azaleas and rhododendrons should be exhibited in the first instance before the Joint Committee and, if considered worthy, they will be selected for trial. All other rhododendron hybrids, as well as all species, are eligible for awards when exhibited in London.

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JOINT ROCK-GARDEN PLANT COMMITTEE, 1939.

The Joint Rock-Garden Plant Committee deals with all plants for the rock-garden or alpine house.

CHAIRMAN.

Stern, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.

VICE-CHAIRMEN.

Bowes-Lyon, The Hon. **David**, St. Paul's Waldenbury, Hitchin, Herts.
Musgrave, C. T., V.M.H., Olivers, Hascombe, Godalming, Surrey.

Kaye, A. W., R.H.S. Offices. (*Secretary*.)

R.H.S. REPRESENTATIVES.

BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.
BYNG OF VIMY, The Viscountess, Thorpe Hall, Thorpe-le-Soken, Essex.
ELLIOTT, CLARENCE, Six Hills Nursery, Stevenage, Herts.
FENWICK, MARK, J.P., V M.H., Abbotswood, Stow-on-the-Wold, Gloucestershire.
LAWRENCE, Lady, Riverdale, Dorking, Surrey.
PERRY, AMOS, V.M.H., Hardy Plant Farm, Enfield, Middlesex.
PRESTON, F. G., V.M.H., University Botanic Garden, Cambridge.
STOKER, Dr. FRED, F.L.S., V.M.H., The Summit, Golding's Hill, Loughton, Essex.

ALPINE GARDEN SOCIETY'S REPRESENTATIVES.

ANDERSON, E. B., Russetings, Loudwater, Rickmansworth, Herts.
BAKER, G. P., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks, Kent.
DONCASTER, E. D., Byways, Burley, near Ringwood, Hants.
GIUSEPPI, Dr. P. L., Trevose, Felixstowe, Suffolk.
HIGGINS, Mrs. V., 28 Northampton Road, Croydon, Surrey.
INGWERSEN, W. E. TH., Birch Farm Hardy Plant Nursery, Gravetye, East Grinstead, Sussex.
MOONEY, Capt. G. K., Southmead, Weald, Sevenoaks, Kent.
ROSENHEIM, PAUL, 27 Spencer Road, East Molesey, Surrey.
PULHAM, J. R., 71 Newman Street, W. 1. (*Hon. Secretary*, Alpine Garden Society.)

The Committee will meet at the following times:

> at 12.30 P.M. on the first day of all Fortnightly Meetings; at 10.30 A.M. at Chelsea on Tuesday, May 16; and at 12.30 P.M. at the Alpine Garden Society's Shows on March 28, April 25 and August 29.

Entries must be handed to the Secretary of the Committee by 10.15 A.M. at Chelsea and by 12 NOON on all other occasions when the Committee meets.

At least one plant must be shown, and for an award as an alpine house plant the plant must be growing in a pot or pan.

* * *

JOINT SWEET PEA COMMITTEE, 1939.

CHAIRMAN.

LEAK, G. W., V.M.H., Flint House, Wisbech, Cambs.

BROWN, F. C., R.H.S. Gardens, Wisley. (*Secretary.*)

R.H.S. REPRESENTATIVES.

ALLAN, D., c/o Dobbie's Seed Farms, Marks Tey, Essex.
CAMPBELL, D., New Lodge, Inner Circle, Regent's Park, N.W. 1.
CRANE, H. H., Highmead, Cheney Lane, Eastcote, Pinner, Middlesex.
DAWKINS, A., c/o Alfred Dawkins (Chelsea), Ltd., 408 King's Road, Chelsea, S.W. 10.
METCALFE, A. W., Rozel, Hatfield Road, St. Albans, Herts.
WILSON, J., The Gardens, Trent Park, New Barnet, Herts.

NATIONAL SWEET PEA SOCIETY'S REPRESENTATIVES.

BOLTON, T., c/o R. Bolton & Son, Birdbrook, Essex.
BURT, G. H., Grange Hill, Coggeshall, Essex.
GOWER, A. W., Calcot Grange Gardens, Reading, Berks.
JANES, E. R., 12 Brooklyn Drive, Emmer Green, Reading, Berks.
MACGREGOR, J., c/o Carters' Tested Seeds, Raynes Park, S.W. 20.
RUNDLE, C. H., The Gardens, Barton Court, Canterbury, Kent.
STEVENSON, J., Poole Road, Wimborne, Dorset.
GLANVILLE, S. J., 3 Royal Avenue, Chelsea, S.W. 3. (*Hon. Secretary*, National Sweet Pea Society.)

The Committee will meet at the trials at Wisley on receipt of notice.

JOINT COMMITTEE FOR COMMERCIAL FRUIT TRIALS, 1939.

CHAIRMAN.

Hall, Sir **Daniel**, K.C.B., LL.D., D.Sc., F.R.S., V.M.H., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.

R.H.S. Representatives.

Bear, E. M., Fruit Farm, Magham Down, Hailsham, Sussex.
Bunyard, E. A., F.L.S., Allington, Maidstone, Kent.
Chittenden, F. J., F.L.S., V.M.H., R.H.S. Hall, Vincent Square, S.W. 1.
Crane, M. B., A.L.S., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
Hatton, R. G., C.B.E., M.A., D.Sc., V.M.H., East Malling Research Station, East Malling, Kent.
Neame, **Thomas**, The Offices, Macknade, Faversham, Kent.
Smith, **Cuthbert** S., Elm House, Boughton Monchelsea, Maidstone, Kent.

Ministry of Agriculture and Fisheries' Representatives.

Barker, Prof. B. T. P., M.A., University of Bristol Research Station, Long Ashton, Bristol.
Fryer, J. C. F., O.B.E., M.A., F.R.E.S., Plant Pathological Laboratory, Milton Road, Harpenden, Herts.
Leak, G. W., V.M.H., Flint House, Lynn Road, Wisbech, Cambs.
Lobjoit, Sir **William** G., O.B.E., J.P., V.M.H., Oakdene, Wooburn, High Wycombe, Bucks.
Taylor, H. V., O.B.E., D.Sc., V.M.H., Ministry of Agriculture and Fisheries, 10 Whitehall Place, S.W. 1.

* * *

EXHIBITION COMMITTEE, 1939.

CHAIRMAN.

Musgrave, C. T., V.M.H., Olivers, Hascombe, Godalming, Surrey.

VICE-CHAIRMEN.

Leak, G. W., V.M.H., Flint House, Lynn Road, Wisbech, Cambs.
Monro, G., C.B.E., V.M.H., 4 Tavistock Street, Covent Garden, W.C. 2.

Allwood, M. C., F.L.S., Wivelsfield Nurseries, Haywards Heath, Sussex.
Bowes-Lyon, The Hon. **David**, St. Paul's Waldenbury, Hitchin, Herts.
Bunyard, G. N., F.L.S., 10 Faraday Road, Maidstone, Kent.
Du Cane, General Sir **John**, G.C.B., 28 Draycott Place, S.W. 3.
Elliott, **Clarence**, Six Hills Nursery, Stevenage, Herts.
Fife, **William**, c/o Dobbie & Co., Ltd., Edinburgh 7.
Harvey-Cant, F. S., Braiswick Rose Gardens, Colchester, Essex.
Hay, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.
Langdon, C. F., V.M.H., Twerton Hill Nursery, Bath, Somerset.
Nix, C. G. A., V.M.H., Tilgate, Crawley, Sussex.
Oldham, W. R., J.P., V.M.H., Chimney Close, Windlesham, Surrey.
Palmer, The Hon. **Lewis**, 14 Buckingham Palace Gardens, S.W. 1.
Pinckney, G. H., c/o John Waterer, Sons & Crisp, Ltd., Bagshot, Surrey.
Riding, **Jas.** B., The Nurseries, Chingford, E. 4.
Rothschild, L. **de**, O.B.E., V.M.H., 18 Kensington Palace Gardens, W. 8.
Russell, L. R., V.M.H., Richmond Nurseries, Windlesham, Surrey.
Sander, **Frederick** K., The Camp, St. Albans, Herts.
Secrett, F. A., F.L.S., V.M.H., Bell Farm, Felcott Road, Walton-on-Thames, Surrey.
Sutton, L. **Noël**, Hillside, Reading, Berks.
Wallace, R. W., J.P., V.M.H., The Old Gardens, Tunbridge Wells, Kent.
Wood, A. J., c/o Wm. Wood & Son, Ltd., Taplow, Bucks.

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BOARD OF EXAMINERS, 1939.

Horticultural Examinations.

CHAIRMAN.

WEISS, Prof. F. E., D.Sc., LL.D., F.R.S., F.L.S., Easedale, Woodway, Merrow, near Guildford, Surrey.

BARRATT, Miss KATE, C.B.E., D.Sc., The Horticultural College, Swanley, Kent.
BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.
BURGESS, A. E., M.B.E., 215 Park Road, Kingston Hill, Surrey.
CHITTENDEN, F. J., F.L.S., V.M.H., R.H.S. Offices, Vincent Square, S.W. 1.
CREEK, A. H., School House, Bures, Suffolk.
DARLINGTON, H. R., M.A., LL.M., F.L.S., V.M.H., Park House, Potters Bar, Middlesex.
DURHAM, F. R., C.B.E., M.C., R.H.S. Offices, Vincent Square, S.W. 1.
ROBINSON, G. W., Chelsea Physic Garden, S.W. 3.
TAYLOR, H. V., O.B.E., D.Sc., V.M.H., Ministry of Agriculture and Fisheries, S.W. 1.
TURNER, A. D., N.D.H., Somerset Farm Institute, Cannington, nr. Bridgwater, Somerset.

British Floral Art Diploma Examinations.

CHAIRMAN.

MONRO, G., C.B.E., V.M.H., 4 Tavistock Street, Covent Garden, W.C. 2.

VICE-CHAIRMAN.

BOWES-LYON, The Hon. DAVID, St. Paul's Waldenbury, Hitchin Herts.

ANLEY, Mrs., St. George's, Wych Hill Lane, Woking, Surrey.
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DARLINGTON, H. R., M.A., LL.M., F.L.S., V.M.H., Park House, Potters Bar, Middlesex.
FURNISS, Mrs., c/o London Gardens, 118–120 Knightsbridge, S.W. 1.
GALSWORTHY, F., Green Lane Farm, Chertsey, Surrey.
HAMMOND, C. J., 27 The Crossways, Wembley Park, Middlesex.
JOLIS, H., 459A Finchley Road, N.W. 3.
STANLEY, The Lady BEATRIX, C.B.E., C.I., Sibbertoft Manor, Market Harborough, Leics.
YARDE, Capt. CYRIL, c/o Yarde & Co., Abington Square, Northampton.

* * *

WISLEY ADVISORY COMMITTEE, 1939.

THE COUNCIL and

*BLACKMAN, Prof. V. H., M.A., Sc.D., F.R.S., 17 Berkeley Place, S.W. 19.
*BUNYARD, E. A., F.L.S., Allington, Maidstone, Kent.
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DU CANE, General Sir JOHN, G.C.B., 28 Draycott Place, S.W. 3.
FENWICK, MARK, J.P., V.M.H., Abbotswood, Stow-on-the-Wold, Glos.
*FRYER, J. C. F., O.B.E., M.A., F.R.E.S., Plant Pathological Laboratory, Milton Road, Harpenden, Herts.
*HALL, Sir DANIEL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
*HILL, Sir ARTHUR W., K.C.M.G., M.A., Sc.D., F.R.S., F.L.S., V.M.H., Royal Botanic Gardens, Kew, Surrey.
JORDAN, F., V.M.H., Yewdene, Edenbridge, Kent.
LOBJOIT, Sir WILLIAM G., O.B.E., J.P., V.M.H., Oakdene, Wooburn, High Wycombe, Bucks.

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* Wisley Advisory Scientific Sub-Committee, 1939.

*RAMSBOTTOM, J., O.B.E., M.A., Dr.Sc., F.L.S., British Museum (Natural History), Cromwell Road, S W. 7.
STEVENSON, J. B., Tower Court, Ascot. Berks
SUTTON, L. NOËL, Hillside, Reading, Berks.
TAYLOR, H. V., O.B.E., D.Sc., V.M.H., Ministry of Agriculture and Fisheries, 10 Whitehall Place, S.W. 1.
TROTTER, R. D., Leith Vale, Ockley, Surrey.
*WEISS, Prof. F. E., D.Sc., LL.D., F.R.S., F.L.S., Easedale, Woodway, Merrow, near Guildford, Surrey.

* * *

PUBLICATIONS COMMITTEE, 1939.

CHAIRMAN.

STEVENSON, J. B., Tower Court, Ascot, Berks.

VICE-CHAIRMEN.

ABERCONWAY, Lord, C.B.E., V.M.H., 38 South Street, Mayfair, W. 1.
BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

BAKER, G. P., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks, Kent.
BUNYARD, E. A., F.L.S., Allington, Maidstone. Kent.
HALL, Sir DANIEL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
HAY, T., C.V.O., V.M H., New Lodge, Hyde Park, W 2.
HILL, Sir ARTHUR W., K C.M.G., M.A., Sc D., F.R.S., F.L.S., V.M.H., Royal Botanic Gardens, Kew, Surrey.
MESSEL, Lt.-Col. L. C. R., O.B.E., Nymans, Handcross, Sussex.
MUSGRAVE, C. T., V.M.H., Olivers, Hascombe, Godalming, Surrey.
PALMER, The Hon. LEWIS, 14 Buckingham Palace Gardens, S.W. 1.
ROSSE, The Earl of, Birr Castle, King's County, Ireland.
STERN, Major F. C., O.B E., M C., F.L.S., 16 Montagu Square, W. 1.
STOKER, Dr. FRED, F.L.S., V.M.H., The Summit, Golding's Hill, Loughton, Essex.
STRATHCONA AND MOUNT ROYAL, Lord, 14 South Audley Street, W. 1.
TROTTER, R. D., Leith Vale, Ockley, Surrey.

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BUNYARD, E. A., F.L.S., Allington, Maidstone, Kent.

VICE-CHAIRMAN.

BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

COTTON A. D., O.B.E., F.L.S., The Herbarium, Royal Botanic Gardens, Kew, Surrey.
GROVE, A., F.L.S., V.M.H., Branstone Lodge, 232 Kew Road, Kew, Surrey.
HAY, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.
MESSEL, Lt.-Col. L. C. R., O.B.E., Nymans, Handcross, Sussex.
PALMER, The Hon. LEWIS, 14 Buckingham Palace Gardens, S.W. 1.
ROSENHEIM, PAUL, 27 Spencer Road, East Molesey, Surrey.
STERN, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.
STOKER, Dr. FRED, F.L.S., V.M.H., The Summit, Golding's Hill, Loughton, Essex.
TINCKER, M. A. H., M.A., D.Sc., F.L.S., R.H.S. Gardens, Wisley, Ripley, Surrey.
WEISS, Prof. F. E., D.Sc., LL.D., F.R.S., F.L.S., Easedale, Woodway, Merrow, near Guildford, Surrey.

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* Wisley Advisory Scientific Sub-Committee, 1939.

PICTURE COMMITTEE, 1939.

CHAIRMAN.

BOWLES, E. A., M.A., F.L.S., F.R.E.S., V.M.H., Myddelton House, Bulls Cross, Enfield, Middlesex.

COTTON, A. D., O.B.E., F.L.S., The Herbarium, Royal Botanic Gardens, Kew, Surrey.
DU CANE, General Sir JOHN. G.C.B., 28 Draycott Place, S.W. 3.
GALSWORTHY, F., Green Lane Farm, Chertsey, Surrey.
NASH, JOHN, Meadle, Aylesbury, Bucks.
OGILVIE-GRANT, MARK, The Larches, Iver Heath, Iver, Bucks.
STANLEY, The Lady BEATRIX, C.B.E., C.I., Sibbertoft Manor, Market Harborough, Leics.

The Committee will meet at the following times:

at 11.30 A.M. at the Fortnightly Meetings on January 10 and 24, February 7, November 7 and 28, and December 12.

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LILY COMMITTEE, 1939.

CHAIRMAN.

STERN, Major F. C., O.B.E., M.C., F.L.S., 16 Montagu Square, W. 1.

VICE-CHAIRMEN.

COTTON, A. D., O.B.E., F.L.S., The Herbarium, Royal Botanic Gardens, Kew, Surrey.
GROVE, A., F.L.S., V.M.H., Branstone Lodge, 232 Kew Road, Kew, Surrey.

SIMMONDS, A., R.H.S. Offices. (*Secretary.*)

ABERCONWAY, Lord, C.B.E., V.M.H., 38 South Street, Mayfair, W. 1.
AMSLER, Dr. M., Delmonden Manor, Hawkhurst, Kent.
BENSON, Capt. C. E., 24 Old Broad Street, E C. 2.
COMBER, J., V.M.H., The Gardens, Nymans, Handcross, Sussex.
CONSTABLE, W. A., Trotting Hill. Southborough, Tunbridge Wells, Kent.
COUTTS, J., M.B.E., V.M.H., Lasswade, Green Meads, Westfield, Woking, Surrey.
CURTIS, C. H., F.L.S., V.M.H., 24 Boston Manor Road, Brentford, Middlesex.
DILLISTONE, G., 50 Claremont Road, Tunbridge Wells, Kent.
FENWICK, MARK, J.P., V.M.H., Abbotswood, Stow-on-the-Wold, Glos.
HAMILTON, The Marquis of, 22 Cambridge Square, W. 2.
HARLEY, ANDREW, Blinkbonny, Kirkcaldy, Fifeshire.
HAY, T., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.
JAMES, The Hon. ROBERT, St. Nicholas, Richmond, Yorks.
JENKINSON, Capt. R. C. H., The White House, Windlesham, Surrey.
MILNER, Sir WILLIAM, Bt., Parcevall Hall, Appletrewick, Skipton, Yorks.
NAPIER, Lt.-Col. GEORGE S. F., Little London, Horam, Sussex.
OGILVIE, L., M.A., M.Sc., Research Station, Long Ashton, Bristol.
PERRY, AMOS, V.M.H., Hardy Plant Farm, Enfield, Middlesex.
RAFFILL, C. P., 197 Kew Road, Kew, Surrey.
ROSE, F. J., Townhill Park Gardens, West End, Southampton.
ROSENHEIM, PAUL, 27 Spencer Road, East Molesey, Surrey.
SCRASE-DICKINS, C. R., M.A., D.L., V.M.H., Coolhurst, Horsham, Sussex.
SMITH, Sir WILLIAM WRIGHT, M.A., F.R.S.E., F.L.S., V.M.H., Royal Botanic Garden, Edinburgh 4.
SPENDER-CLAY, The Hon. Mrs. PAULINE, Ford Manor, Lingfield, Surrey.
STANLEY, The Lady BEATRIX, C.B.E., C.I., Sibbertoft Manor, Market Harborough, Leics.
STOKER, Dr. FRED, F.L.S., V.M.H., The Summit, Golding's Hill, Loughton, Essex.
STOOKE, J. E. H., Danesmere, Hereford.
TAYLOR, G. M., Links Cottage, Longniddry, East Lothian.
TROTTER, R. D., Leith Vale, Ockley, Surrey.
WALLACE, R. W., J.P., V.M.H., The Old Gardens, Tunbridge Wells, Kent.
WOODCOCK, Judge H. DRYSDALE, K.C., 8 Netherhall Gardens, Hampstead, N.W. 3.

CORRESPONDENTS OF THE LILY COMMITTEE.

CALDER, C. C., B.Sc., F.L.S., Royal Botanic Garden, Sibpur, nr. Calcutta, India.
CRAIG, WILLIAM N., Front Street at Federal, Weymouth 88, Mass., U.S.A.
DEBRAS, E., 15 Rue Le Notre, St. Jean de Braye, Loiret, France.
EASTWOOD, Miss ALICE, California Academy of Sciences, Golden Gate Park, San Francisco, California, U.S A.
ERREY, G., Lilydale, Victoria, Australia.
HOOG, J., c/o C. G. van Tubergen, Ltd., Zwanenburg Nurseries, Haarlem, Holland.
KESSELRING, W., The Botanic Garden, Darmstadt, Germany.
KRELAGE, E. H., 6 Stolbergstraat, Haarlem, Holland.
LEMPERG, Dr. F , Hatzendorf, Austria.
LONG, E. P., 1 Empire Road, Bemerton, Salisbury, Wilts.
MATSUZAKI, N., The Botanic Gardens, Science College, Imperial University, Tokyo, Japan.
PRESTON, Miss I., Central Experimental Farm, Ottawa, Canada.
PURDY, CARL, Ukiah, California, U S.A.
SCHACHT, W., Curator of the Royal Gardens, The Royal Palace, Sofia, Bulgaria.
SOUILLET, L'ABBÉ H , Curé de Milly par Gennes, Maine et Loire, France.
STOUT, Dr. A. B., The New York Botanical Garden, Bronx Park (Fordham Branch P O), New York, U.S.A.
STOYANOFF, Prof. N., Faculty of Sciences, Sofia University, Sofia, Bulgaria.
TELFORD, Dr. T. FLETCHER, 44 Pratt Street, Redcliffs, Christchurch, New Zealand.
UNGER, ALFRED, Heidelburg-Schlierbach, Germany.
VOLLMER, Dr. A. M., 384 Post Street, San Francisco, U.S.A.
WADA, K., Hakoneya Nurseries, Numazu-shi, Japan.
WARD, F. KINGDON, V.M.H., Cleeve Court, Streatley-on-Thames, Berks.

VICTORIA MEDAL OF HONOUR IN HORTICULTURE.—V.M.H.

Established A.D. 1897, with the gracious assent of Her Majesty Queen Victoria in perpetual remembrance of Her Majesty's glorious reign, and to enable the Council to confer conspicuous honour on those British Horticulturists resident in the United Kingdom whom it might from time to time consider deserving of special honour at the hands of the Society. At the time of its institution the Medal was confined to 60 recipients in reference to the 60 years of Her Majesty's reign. At Her Majesty's death it seemed to the Council fitting that the number of Medallists should be increased to 63, representing the full number of the years of her reign.

1934 ABERCONWAY, Lord, C.B.E., 38 South Street, Mayfair, W. 1.
1926 ALEXANDER, H. G., Woodlands, Westonbirt, Tetbury, Glos.
1933 BAKER, G. P., Hillside, Oakhill Road, Kippington, Sevenoaks, Kent.
1927 BALFOUR, F. R. S., M.A., D.L., J.P., 13 Collingham Gardens, S.W. 5.
1924 BARNES, N. F., The Gardens, Eaton Hall, Chester.
1931 BARR, P. R., 61 Kingsfield Road, Oxhey, Herts.
1923 BARTHOLOMEW, A. C., 75 Tilehurst Road, Reading.
1917 BEAN, W. JACKSON, C.V.O., I.S.O., 2 Mortlake Road, Kew, Surrey.
1938 BEWLEY, WM. F., C.B.E., D.Sc., Experimental and Research Station, Cheshunt, Herts.
1922 BILNEY, WILLIAM A., J.P., Monks View, Newbury, Berks.
1932 BLISS, D., Parks Department, 4 Mount Street, Swansea, Glam.
1922 BOSCAWEN, Rev. Canon ARTHUR T., Ludgvan Rectory, Cornwall.
1916 BOWLES, E. A., M.A., F.L.S., F.R.E.S., Myddelton House, Bulls Cross, Enfield.
1917 CHITTENDEN, FREDERICK J., F.L.S., Todd House, West Clandon, Surrey.
1936 CLARKE, Colonel STEPHENSON R., C.B., J.P., LL.D., Borde Hill, Haywards Heath, Sussex.
1908 COLMAN, Sir JEREMIAH, Bt., M.A., D.L., J.P., Gatton Park, Reigate.
1936 COMBER, J., The Gardens, Nymans, Handcross, Sussex.
1933 COUTTS, J., M.B.E., Lasswade, Green Meads, Westfield, Woking.
1935 CRANFIELD, W. B., F.L.S., East Lodge, Enfield Chase, Middlesex.
1930 CURTIS, C. H., F.L.S., 24 Boston Manor Road, Brentford, Middlesex.

1931 Dallimore, W., I.S.O., Kew Cottage, The Ridge, Bidborough, nr. Tunbridge Wells, Kent.
1938 Darlington, H. R., M.A., LL.M., F.L.S., Park House, Potters Bar, Middlesex.
1912 Divers, W. H., Westdean, Hook, Surbiton.
1933 Farmer, Sir John, LL.D., D.Sc., F.R.S., St. Leonards, Weston Road, Bath.
1937 Fenwick, Mark, J.P., Abbotswood, Stow-on-the-Wold, Glos.
1910 Fielder, Charles R., The Bungalow, Bramshaw, Hants.
1924 Grove, A., F.L.S., Branstone Lodge, Kew Road, Kew, Surrey.
1935 Hall, Sir Daniel, K.C.B., LL.D., D.Sc., F.R.S., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19.
1926 Harrow, R. L., R.H.S. Gardens, Wisley, Ripley, Surrey.
1930 Hatton, R. G., C.B.E., M.A., D.Sc., East Malling Research Station, Kent.
1924 Hay, Thomas, C.V.O., New Lodge, Hyde Park, W. 2.
1934 Hill, Sir Arthur W., K.C.M.G., M.A., Sc.D., F.R.S., F.L.S., Royal Botanic Gardens, Kew, Surrey.
1930 Jordan, F., Yewdene, Edenbridge, Kent.
1935 Langdon, C. F., Twerton Hill Nursery, Bath, Somerset.
1932 Laxton, E. A. L., 63 High Street, Bedford.
1930 Leak, G. W., Flint House, Lynn Road, Wisbech.
1932 Lobjoit, Sir William G., O.B.E., J.P., Oakdene, Wooburn, High Wycombe, Bucks.
1929 McLeod, J. F., Leven House, Milnathort, Kinross.
1928 Malcolm, Alexander, Blackadder Bank, Chirnside, Berwickshire.
1932 Millard, F. W., Camla Gardens, Copthorne Road, Felbridge, East Grinstead, Sussex.
1934 Monro, G., C.B.E., 4 Tavistock Street, Covent Garden, W.C. 2.
1897 Moore, Sir Frederick W., M.A., F.L.S., Rathfarnham, Dublin.
1926 Musgrave, C. T., Olivers, Hascombe, Godalming, Surrey.
1923 Nix, Charles G. A., Tilgate, Crawley.
1937 Oldham, W. R., J.P., Chimney Close, Windlesham, Surrey.
1935 Perry, Amos, Hardy Plant Farm, Enfield, Middlesex.
1926 Pettigrew, W. W., Trees, First Avenue, Broadwater, Worthing.
1912 Prain, Lt.-Col. Sir David, C.M.G., C.I.E., M.A., M.B., LL.D., F.R.S., F.L.S., The Well Farm, Warlingham, Surrey.
1938 Preston, F. G., University Botanic Garden, Cambridge.
1937 Puddle, F. C., The Gardens, Bodnant, Tal-y-Cafn, Denbighshire.
1938 Reuthe, G., Sunnycroft, 109 Crown Lane, Bromley, Kent.
1929 Rothschild, Lionel de, O.B.E., 18 Kensington Palace Gardens, S.W. 8.
1929 Russell, L. R., Richmond Nurseries, London Road, Windlesham, Surrey.
1934 Scrase-Dickins, C. R., M.A., D.L., Coolhurst, Horsham, Sussex.
1936 Secrett, F. A., F.L.S., Bell Farm, Felcott Road, Walton-on-Thames, Surrey.
1933 Shawyer, George, The Nurseries, Uxbridge, Middlesex.
1925 Smith, Sir William Wright, M.A., F.R.S.E., F.L.S., Royal Botanic Garden, Edinburgh.
1937 Stoker, Dr. Fred, F.L.S., The Summit, Golding's Hill, Loughton.
1937 Taylor, H. V., O.B.E., D.Sc., Ministry of Agriculture & Fisheries, S.W. 1.
1923 Wallace, Robert W., J.P., The Old Gardens, Tunbridge Wells.
1926 Wallace, W. E., J.P., The Nurseries, Eaton Bray, Dunstable.
1932 Ward, Capt. F. Kingdon, Cleeve Court, Streatley-on-Thames.
1920 White, Edward, 7 Victoria Street, S.W. 1.

FORMER HOLDERS OF THE VICTORIA MEDAL OF HONOUR.

1931 Aberconway, Lady, C.B.E. (d. 1933).
1928 Atkinson, Wm., J.P. (d. 1933).
1897 Baker, J. G., F.R.S., F.L.S. (d. 1920).
1897 Balfour, Sir I. B., K.B.E., F.R.S. (d. 1922).
1907 Ballantine, Henry (d. 1929).
1897 Barr, Peter (d. 1909).
1897 Barron, Archibald F. (d. 1903).
1901 Bateson, William, D.Sc., F.R.S. (d. 1926).
1897 Beale, Edward John, F.L.S. (d. 1902).
1906 Beckett, Edwin (d. 1935).
1902 Bennett-Poe, John T., M.A. (d. 1926).
1897 Boxall, W. (d. 1910).
1897 Bull, William, F.L.S. (d. 1902).
1897 Bunyard, George (d. 1919).
1897 Burbidge, F. W., M.A., F.L.S. (d. 1905).
1902 Cannell, Henry (d. 1914).
1904 Challis, Thomas (d. 1923).
1914 Cheal, Joseph (d. 1935).
1902 Cooke, Dr. M. C., M.A., LL.D. (d. 1914).
1911 Coomber, Thomas (d. 1926).
1918 Crisp, Sir Frank (d. 1919).
1897 Crump, William (d. 1932).
1914 Cuthbertson, Wm. (d. 1934).
1910 Cypher, J. J. (d. 1928).
1904 Dean, Alexander (d. 1912).
1897 Dean, Richard (d. 1905).
1925 Dicks, S. B. (d. 1926).
1907 Dickson, George (Newtownards) (d. 1914).
1897 Dickson, George (Chester) (d. 1909).
1897 d'Ombrain, Rev. H. H., M.A. (d. 1905).
1899 Douglas, James (d. 1911).
1897 Druery, Charles T., F.L.S. (d. 1917).
1897 Dunn, Malcolm (d. 1899).
1925 Dykes, W. R., M.A., L.-ès-L. (d. 1925).
1905 Eckford, Henry (d. 1905).
1897 Ellacombe, Rev. Canon (d. 1916).

1897	Elwes, Henry J., F.R.S., F.L S. (d. 1922).
1900	Engleheart, G. H., M A., F.S A. (d. 1936).
1903	Fenn, Robert (d. 1912).
1921	Forrest, George (d. 1932).
1897	Foster, Sir Michael, K.C.B, F.R.S. (d. 1907).
1897	Fraser, John (d. 1900).
1922	Fraser, John, F.L.S. (d. 1935).
1916	Gibbs, The Hon. Vicary (d 1932).
1909	Goodacre, James H. (d. 1922).
1897	Gordon, George (d. 1914).
1934	Hales, W., A.L.S. (d 1937).
1924	Hanbury, F. J., F L S (d. 1938).
1903	Hanbury, Sir Thomas, K.C.V.O., F.L.S. (d. 1907).
1897	Heal, John (d. 1925).
1909	Hemsley, Dr. W. B, F R S, F.L.S. (d 1924).
1906	Henry, Prof A., M A, F.L S. (d 1930).
1897	Henslow, Rev. Prof. G., M.A, F.L.S. (d 1925).
1897	Herbst, Hermann (d 1904).
1897	Hole, The Very Rev S. Reynolds, Dean of Rochester (d. 1904).
1897	Hooker, Sir Joseph, G.S.C.I., C.B., O.M., F R.S. (d. 1911)
1897	Horner, Rev. F D., M.A. (d 1912).
1930	Hort, Sir Arthur, Bt (d. 1935).
1897	Hudson, James (d 1932)
1897	Jekyll, Miss Gertrude (d. 1932).
1925	Jones, H J. (d 1928).
1897	Kay, Peter E. (d 1909).
1909	Ker, R. Wilson (d 1910).
1901	King, Sir G., K C.I.E, F R.S, F L S. (d 1909).
1897	Laing, John (d. 1900).
1922	Lambourne, The Rt. Hon Lord, P C., G C V O (d 1928)
1900	Lawrence, Sir Trevor, Bt, K C V.O. (d 1913).
1929	Lawrence, Sir William, Bt (d 1934)
1907	Llewelyn, Sir John T. D., Bt, F L.S. (d 1927).
1923	Lowe, Joseph (d 1929)
1906	Lynch, R Irwin, M A, A L S (d 1924).
1920	McHattie, J W (d. 1923)
1897	McIndoe, James (d 1910).
1909	Mackellar, A. C. (d 1931).
1897	Maries, Charles, F L S (d. 1902).
1906	Marshall, William, F E S. (d 1917).
1902	Massee, George, F L S (d 1917).
1904	Mawley, Edward, F R M S (d 1916).
1917	Maxwell, Rt. Hon. Sir Herbert E., Bt., K.T., P.C., D C.L, LL.D., F.R.S. (d. 1937)
1910	May, Henry B (d. 1936).
1927	Millais, J G. (d 1931)
1897	Milner, Henry Ernest, F.L S. (d 1906).
1897	Molyneux, Edwin (d 1921).
1897	Monro, George (d 1920).
1925	Moore, G. F. (d. 1927).
1897	Morris, Sir Daniel, K.C.M.G. (d. 1933).
1924	Morris, Sydney (d. 1924).
1925	Mount, George (d. 1927).
1897	Nicholson, George, F L S. (d. 1908).
1901	Norman, George (d. 1906).
1897	O'Brien, James (d. 1930).
1901	Ormerod, Miss E. A., LL.D. (d. 1901).
1897	Paul, George, J.P. (d. 1921).
1897	Paul, William, F L.S. (d. 1905).
1911	Pearson, Alfred H., J.P. (d. 1930).
1924	Pearson, Charles E. (d. 1929).
1914	Pinwill, Capt. W. (d 1926).
1922	Poupart, Wm. (d. 1936).
1904	Redesdale, Lord, G.C.V.O., C.B. (d 1916).
1917	Rendle, A. B., M.A., D.Sc., F.R.S., F.L.S. (d. 1938).
1897	Rivers, T. Francis (d. 1899).
1925	Rochford, J. (d 1932).
1921	Rolfe, R A, A L.S. (d 1921).
1917	Rollit, Sir A K, D C L, LL.D. (d 1922).
1908	Ross, Charles (d. 1917).
1897	Rothschild, Lord, M.A., Ph.D., F R S., F L S (d. 1937).
1897	Sander, Frederick, F.L S (d. 1920)
1897	Schroder, Baron Sir Henry, Bt., C.V O. (d. 1910).
1897	Seden, John (d. 1920).
1897	Sherwood, N. N. (d 1916).
1916	Slocock, W C. (d. 1926).
1897	Smith, James (d. 1903).
1897	Smith, Martin R. (d 1908).
1906	Smith, Thomas (d. 1919).
1897	Speed, Walter (d 1921).
1927	Stapf, Dr O, F R S., F.L.S. (d 1933).
1897	Sutton, A. W., J.P, F.L.S. (d. 1925)
1901	Sweet, James (d. 1924).
1926	Theobald, Prof. F. V., M.A., F.E.S. (d 1930).
1897	Thomas, Owen (d 1923).
1897	Thompson, David (d. 1909).
1897	Thompson, William (d 1903)
1897	Turner, Harry (d. 1906).
1906	Veitch, Sir Harry J, F.L S (d 1924).
1916	Veitch, P C M, J P (d 1929).
1936	Wakehurst, Lord, F L.S. (d. 1936).
1926	Watkins, A. (d 1937)
1916	Watson, W, A L S (d. 1925).
1927	White, H (d 1938)
1927	White, J. T. (d. 1930).
1912	Whitton, J (d 1925).
1914	Whytock, James (d 1926)
1912	Wilks, Rev William, M A (d 1923)
1927	Williams, P D (d 1935).
1897	Willmott, Miss E., F.L S. (d. 1934).
1912	Wilson, Dr. E. H., M A. (d. 1930).
1897	Wilson, G. F., F R S., F.L S. (d. 1902).
1897	Wolley-Dod, Rev. C., M.A. (d. 1904).
1897	Wright, John (d. 1916)
1920	Wright, Samuel T (d 1922).
1897	Wythes, George (d. 1916).
1925	Yeld, G., M A (d. 1938).

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV

February 1939

FORTHCOMING EVENTS.

THE beginning of the year is a good opportunity to remind Fellows and Associates of the importance of these notes on "Forthcoming Events." In these notes it is possible to remind Fellows and Associates monthly of the doings of the Society, and to inform them of alterations in the calendar as printed in the January JOURNAL or on their tickets.

The practice is that in the "Forthcoming Events" particulars of two months are given, the current and the coming, so that should there be any slight delay in the receipt of the current JOURNAL, through postal or other causes, the information will always be found in the previous month's JOURNAL.

INFORMAL TALKS.

Many years ago Professor HENSLOW used to give informal talks on plants shown in the Halls. It has now been decided, in view of the fact that most of the shows are two-day shows with lectures on the first day, to resuscitate this custom and arrange for informal talks on the second day of two-day shows. Thus Fellows and Associates who are not in the position to enjoy the lecture programmes arranged for the first day may at all events have an opportunity of hearing some discussions on horticultural matters on the second day.

These talks, which are being arranged with well-known horticulturists, will be quite informal and will be in the charge of the speaker. He will borrow plants from the various exhibits in the Hall, and after he has spoken a discussion will take place.

It is hoped that these talks will be appreciated, and the informality of the meeting will be sufficient to overcome any shyness on the part of the audience, so that interesting and valuable discussions will take place.

On Wednesday, February 22, at 3.30 P.M. in the Lecture Room, the first talk will be given by Mr. C. H. CURTIS, V.M.H.

On March 8 Mr. F. G. PRESTON, V.M.H., will speak, and on March 22 Mrs. GWENDOLINE ANLEY has kindly undertaken the duty.

SUBSCRIPTIONS.

All annual subscriptions are payable in advance on January 1 of each year. Fellows and Associates may like to relieve themselves of any further trouble in future years by compounding by payment of a lump sum for life Fellowship, particulars of which can be obtained from the Secretary, or by obtaining from the Secretary a banker's order, thereby instructing their bankers to pay their subscriptions regularly on January 1 each year.

CHANGE OF ADDRESS.

Fellows and Associates are reminded that it is of material assistance to the Secretary in dispatching their tickets, plant distribution lists, JOURNAL, or any other communications that may have to be addressed to them, if changes of address or changes in bankers are promptly notified to him.

PLANT DISTRIBUTION.

With the January JOURNAL the list of seeds and plants available for distribution in 1939 together with an application form for them were distributed.

It should be noted that application forms must be returned on or before March 11, except by Fellows resident abroad.

From time to time reports are received that these lists and forms have not been delivered, and the Secretary would be much obliged if Fellows would immediately notify him should they find no copy of these lists and forms in their January JOURNAL, so that a set may be sent.

AUTUMN SHOW.

It is satisfactory to be able to report that negotiations are now in progress for the provision of a Great Autumn Show at Earls Court. The proposed dates for the show are September 13, 14 and 15.

Further details will be published in these notes as soon as possible after the negotiations have been brought to a successful conclusion.

The holding of such a show necessitates alterations in regard to the arrangements already made for September. These alterations will also be reported in a like manner.

CALENDAR.

A Fortnightly Show will be held on February 7 (12 noon to 5 P.M.) and a Lantern Lecture will be given at 3.30 P.M. by Mr. R. E. HAY on "Colour in Rock and Woodland Gardens."

The first of the two-day Fortnightly Shows will take place on February 21 (12 noon to 7.30 P.M.) and 22 (10 A.M. to 5 P.M.). On February 21 at 3 P.M. the Annual General Meeting of the Society will be held, when the President will give an account of the past year's work and present the Report, which will be found on pp. i–ix in this number. The Treasurer will make a statement with regard to the finances of the Society (pp. x–xxiv), after which will follow the presentation of the cups and medals, particulars of which will be found in the Annual Report (p. vii).

On the second day of the Fortnightly Show, February 22, the first of the informal talks on plants exhibited (particulars of which are on p. 65) will be given by Mr. C. H. CURTIS, V.M.H., at 3.30 P.M. in the Lecture Room of the New Hall.

On March 7 (12 noon to 7.30 P.M.) and 8 (10 A.M. to 5 P.M.) there will be a Fortnightly Show, and Mr. D. E. HORTON will lecture in the Lecture Room of the New Hall at 3.30 P.M. on "Bulb Experiments" on March 7.

On March 8 the second informal talk of the year will be given by Mr. F. G. PRESTON at 3.30 P.M. in the Lecture Room of the New Hall.

At Wisley on March 8 and 9 (2 to 4 P.M.) there will be a Practical Demonstration (weather permitting) of Seed Sowing, Indoors and Outdoors. Fellows who wish to attend this demonstration should inform the Director of the Gardens, Wisley, Ripley, Surrey, beforehand, so that all arrangements can be made for the accommodation of those attending the demonstration.

A second demonstration at Wisley will take place on March 15 and 16 (weather permitting) from 2 to 4 P.M. on Rose Pruning and Spring Pruning of Shrubs. Fellows wishing to attend this demonstration should inform the Director of the Gardens beforehand.

At the Fortnightly Meeting on March 21 (12 noon to 7.30 P.M.) and 22 (10 A.M. to 5 P.M.) a Silver Trophy presented by the Orchid Traders will be awarded for an exhibit of 12 Cymbidium plants (species and/or hybrids) staged by an amateur. Entry forms may be had on application to the Secretary and must be returned not later than by the first post on Wednesday, March 15.

Mr. GUY L. WILSON will lecture on "Daffodil Gardening" at 3.30 P.M. in the Lecture Room on March 21.

The informal talk on March 22 will be given by Mrs. GWENDOLINE ANLEY at 3.30 P.M. in the Lecture Room of the New Hall.

The Alpine Garden Society's Show will be held in the Old Hall on March 28 (1 to 7.30 P.M.) and 29 (10 A.M. to 5 P.M.), and the British Carnation Society will hold their Show in the New Hall on the same dates and at the same times.

CHELSEA FLOWER SHOW.

The Chelsea Flower Show this year will be held on Wednesday, Thursday and Friday, May 17, 18 and 19, and Fellows are asked to make a special note of these dates. Further particulars will be published from time to time in these notes.

Entries for the Chelsea Show will close on Monday, February 27, and schedules are obtainable on application to the Secretary.

EXAMINATIONS.

Examinations are an important part of the Society's activities. On March 9 the Society's General Examinations and on March 18 the Examination in School and Cottage Gardening for Teachers will take place throughout the country.

The Written Examination for the British Floral Art Diploma will be held on March 30, and the practical part of this Examination will follow on April 26 and 27.

PUBLICATIONS.

Attention is again drawn to the recent publications of the Society.

The first book is the Index to the JOURNAL (obtainable from the Offices of the Society, £1 paper bound, £1 1*s.* in buckram) complete up to the year 1935. It contains not only references to nearly every kind of flower, fruit and vegetable of garden value, but also a list of the awards that have been given from time to time.

The Daffodil and Lily Year Books for 1938 are now obtainable, the price being 5*s.* each in limp cover and 6*s.* each in stiff cover.

The R.H.S. Diary is likewise available and the price is 2*s.* 2*d.* post free, in Pluviusin with back loop and pencil; 3*s.* 8*d.* post free in Morocco leather (not refillable) with pencil; or 5*s.* 2*d.* post free in refillable Crocodile Case with card and stamp pockets.

Volume I of the Colour Chart has now been published and distributed to subscribers. Fellows may still obtain copies of the Chart at the subscription price of 10*s.* plus postage, 6*d.* inland, 1*s.* overseas.

Copies can be supplied to non-Fellows of the Society at one guinea plus the same postal rates.

Volume II is in preparation and will be available in due course at the prices given above.

SMALL EXHIBITS FROM FELLOWS.

Special attention is drawn to the arrangements for Fellows and other persons interested in Horticulture of the special provision for small exhibits of horticultural, botanical or scientific interest. During the year a number of attractive plants are staged thus, but it is felt that the possibilities of this form of exhibit are not sufficiently appreciated or made use of. The regulation reads as follows :—

> "Fellows are invited to exhibit interesting or well-grown plants, flowers, fruits or vegetables, and any Fellow who desires to stage an exhibit consisting of not more than three pots, vases, or dishes may do so at any Fortnightly Meeting, although he has not applied for space beforehand. Such exhibits must be entered with the clerk at the Small Exhibits Table by noon on the morning of the Meeting, and he will provide exhibitors' cards and stage the exhibits. Exhibitors are not permitted to place on this special table any notices or leaflets, nor may any orders be booked there. Exhibits staged under this regulation may be considered for Certificates of Cultural Commendation."

LINDLEY LIBRARY.

As there will be many new Fellows joining the Society during the coming year to whom the Lindley Library will doubtless be of great value, the terms for the use of the Library are set forth below.

The Library is open daily (Sundays and holidays excepted) from 10 A.M. to 5 P.M. (Saturdays 10 A.M. to 1 P.M.). On Show days the Library will remain open until the close of the Show, except on two-day Shows, when it will be open until 6 o'clock on the first day of the Show.

The right of closing the Library at any time for purposes of re-arrangement, cleaning, etc., is reserved. It will be closed annually for two weeks, usually between the first and second fortnightly meetings of the Society in July, in order that the books may be cleaned and the stock inspected. During this period Fellows will be able to consult books but not to borrow them.

The Fellows of the Society have access to the Library at all times when it is open.

Gardeners and others, not Fellows or Officers of the Society, must make application to the Secretary for permission to use the Library and must enter their names and addresses in a book provided for that purpose.

Anyone requiring the loan of a book to be taken from the Library must make written application to the Secretary, and loans will be granted on the following conditions, viz. :

(*a*) That the borrower be personally known to one or more of the Officers of the Society, or produce satisfactory references.

(*b*) That the borrower sign a receipt for the volumes in a book provided for the purpose, before removing them from the premises, or if unable to attend, acknowledge the receipt on a postcard ; and undertake to restore the books in good condition and to comply with the regulations.

(*c*) That not more than three volumes be lent to one person at one time.

(*d*) That borrowers through the post pay the postage both ways.

A certain discretion will be used as to what books shall be lent, but rare books, which it would be difficult to replace, periodicals, expensive illustrated works and works of reference which are likely to be in frequent requisition within the Library itself may not be removed from the premises.

No books may be sent to Fellows resident abroad.

All books borrowed must be returned to the Library in good condition within one calendar month from the date of issue, and if sent by post must be properly protected and packed, but an extension of time may be granted on application.

The Secretary is empowered to demand of the borrowers such books as are detained beyond the prescribed time, and to take such steps as may be necessary to secure the prompt return of the same.

The loss of any book or any damage must be made good by the borrower.

Fellows requiring books on loan from the "Outlier" Libraries should make written application either to the Secretary of the Society or to the National Central Library for Students, Malet Street, London, W.C. 1.

The Trustees reserve the right of repealing or altering any of these regulations from time to time as may be required.

It has been decided to dispose of certain duplicate volumes of books which are beyond the requirements of the Library, and these will be sold by the auctioneers, Messrs. Sotheby of 34, New Bond Street, W. 1, about the end of February or beginning of March. Particulars may be obtained of the auctioneers.

HALL LETTINGS.

The Halls have been let as follows:—

From February 13 to 17 for the Nursing Exhibition. Particulars obtainable from Nursing Mirror Ltd., Dorset House, Stamford Street, S.E. 1.

From February 15 to 28 for an Inventions Exhibition. For particulars apply to G. D. Coleman, Esq., 10, Victoria Street, S.W. 1.

From March 6 to 11 for the Annual Badminton Tournament. Particulars obtainable from C. Marriott, Esq., c/o The Badminton Association of England, 20, Telford Avenue, Streatham Hill, S.W. 2.

WISLEY IN FEBRUARY.

With increasing light and stronger sunshine comes a gradual increase in the number of plants to be seen in flower in the Gardens this month, not only in the glasshouses but also amongst shrubs, rock plants, and bulbs.

On entering the gates visitors will see the cheerful mauve of the Algerian *Iris unguicularis* against the dull red brick of the Laboratory wall, and neighbouring it that useful if somewhat slow-growing

ROYAL HORTICULTURAL SOCIETY

ESTABLISHED 1804. INCORPORATED 1809.

NOTICE IS HEREBY GIVEN that the ONE HUNDRED AND THIRTY-FIFTH ANNUAL MEETING of the Fellows of the Society will be held in the LECTURE ROOM, NEW HALL, GREYCOAT STREET, WESTMINSTER, on Tuesday, February 21, 1939, at 3 P.M. precisely, for the purpose of receiving the Report of the Council for the past year, and electing a President, Vice-Presidents, Treasurer, Four Members of Council, and Auditor for the ensuing year.

By Order of the Council,
F. R. DURHAM,
Secretary.

Royal Horticultural Hall,
Vincent Square, Westminster, S.W. 1.
January 31, 1939

ANNUAL MEETING

To be held at 3 P.M., February 21, 1939

AGENDA

Minutes of the last Annual Meeting, held February 22, 1938.
Report of the Council.
President's Address.
Treasurer's Statement.
Election of President.
Election of Vice-Presidents.
Election of four Members of Council.
Election of Treasurer.
Election of Auditor.
Presentation of the Victoria Medals of Honour.
Presentation of Associateship of Honour Badges.
Presentation of the Lawrence Medal.
Presentation of the Holford Medal.
Presentation of the Veitch Memorial Medals.
Presentation of the Sander Medal.
Presentation of the George Moore Medal.
Presentation of the Williams Memorial Medals.
Presentation of the Reginald Cory Memorial Cup.
Presentation of the Loder Rhododendron Cup.

[P.T.O.

LIST OF NOMINATIONS

The following list of nominations of President, Vice-Presidents, Members of the Council and Officers for election is circulated in accordance with By-law 58:

	Proposed by	*Seconded by*
As President:		
Lord Aberconway, C.B.E., V.M.H.	Mr. E. A. Bowles.	Mr. C. T. Musgrave.
As Vice-Presidents:		
The Duke of Bedford, K.G., K.B.E., F.R.S.	Lord Aberconway.	Mr. G. Monro.
The Duke of Portland, K.G., G.C.V.O., P.C.		
The Marquess of Headfort		
The Viscount Ullswater, G.C.B.		
Sir Daniel Hall, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.		
Lieut.-Colonel Sir David Prain, C.M.G., C.I.E., LL.D., F.R.S., F.L.S., V.M.H.		
Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H.		
Mr. C. T. Musgrave, V.M.H.		
Mr. C. G. A. Nix, V.M.H.		
Mr. J. C. Williams		
As Members of Council:		
The Hon. David Bowes-Lyon	Major F. C. Stern.	Mr. G. W. Leak.
Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H.	Mr. C. T. Musgrave.	Mr. T. Hay.
Mr. F. A. Secrett, F.L.S., V.M.H.	Mr. W. R. Oldham.	The Hon. Lewis Palmer.
Lord Strathcona and Mount Royal	Sir Daniel Hall.	Lt.-Col. L. C. R. Messel.
As Treasurer:		
Mr. G. Monro, C.B.E., V.M.H.	Mr. J. B. Stevenson.	Mr. E. A. Bunyard.
As Auditor:		
Mr. J. S. Feather, F.C.A.	Mr. L. N. Sutton.	Prof. F. E. Weiss.

By Order of the Council,
F. R. DURHAM,
Secretary.

Saturday, December 31, 1938.

Californian evergreen, *Garrya elliptica,* whose creamy-green tassels are more sparse than usual this year. Towards the end of the month *Acacia dealbata,* of which the old specimen by the entrance door is well known, may be expected to open its fluffy yellow balls of flowers.

In the first or Half-hardy house three attractive plants flowering at this season are *Canarina Eminii* from East Africa ; the bushy, brilliant blue *Lithospermum rosmarinifolium* from Capri, which is hardy outside only in the milder parts of Great Britain ; and *Cassia stipulacea,* trained to one of the supports of the house, bearing a compound inflorescence of bright orange flowers. The comprehensive trial of varieties of *Primula malacoides* is in the second house and will be succeeded by the giant *P. obconica* ' Wyaston Wonder.'

Acacias, Camellias, Epacris, Ericas, and tender Rhododendrons are some of the chief groups now in bloom in the large Temperate house, and *Pentapterygium serpens* with its many pendent, jewel-like red blossoms hung along the branches, the scented white spikes of *Buddleia asiatica,* and the vigorous *Sparmannia africana* are other items accompanying these.

Perhaps the brightest house, however, and that which makes most appeal by reason of its simplicity and the greater ease in cultivating its occupants, is the Alpine house, above the Rock Garden, where at the present time numerous encrusted Saxifrages dominate the scene, chiefly in white or pink or rose, but a few notable for their yellow flowers. They are accompanied by other plants of early spring, such as the purple *Iris reticulata,* golden *Eranthis* × *Tubergenii,* the finest of the Winter Aconites, species of Cyclamen and Anemone, the early white or pink-tinted *Ranunculus calandrinioides* from the Atlas Mountains, and others of like worth. In the beds nearby species of Crocus may be found in bloom if the weather is clement, and in the adjoining frames other bulbous or rhizomatous plants which require some protection on account of their precocity.

On the Rock Garden one of the chief ornaments is the spikes of the early Snowflake, *Leucojum vernum carpathicum,* rising gradually from the dark soil like their relatives the Snowdrops, but having much larger and more prominent white bells with green tips to the segments. *Primula Winteri* has tufts of lavender flowers in the upper rock crevices ; the inconspicuous but sweetly scented flowers of those low-growing evergreen shrubs the Sarcococcas are now open, as well as the large white or pinkish bells of one of the earliest and most charming Rhododendrons, *R. moupinense,* although unfortunately very susceptible to damage from frost, like those of the snow-white *R. leucaspis* which follows it a little later. Amongst the earliest of this family in point of flowering are *R. dauricum* and its variety *mucronulatum,* of rosy hue, and that excellent light purple hybrid *R.* × *praecox* derived from the former. Both of these and the pale yellow *R. lutescens* can be seen in the Wild Garden, where also grow the scented *Daphne Mezereum, Mahonia japonica* with long sprays of pale yellow flowers, the evergreen *Pieris japonica* decorated by hanging racemes of Lily-of-the-

Valley-like bells, and in damp places the rich gold patches of *Narcissus cyclamineus.*

Shrubs in bloom in Seven Acres include two early species of Prunus, *P. Conradinae semi-plena* and *P. Davidiana*; the first citron-yellow Forsythia, *F. Giraldiana*; and the very fragrant *Hamamelis mollis* from China, the best of its race but by no means easy to propagate. Adjacent to it is an extensive planting of *Erica* × *darleyensis*, at its best during the present and following month, while the many forms of *E. carnea* are conspicuous and invaluable for covering the ground and producing their gaily coloured spikes from December to March. A large bed of the variety 'King George' can also be seen in the Award of Merit Garden, where grows the Cornelian Cherry, *Cornus Mas*, whose quantities of yellow stars suggest another Hamamelis, and the glowing golden bush which is *Forsythia intermedia spectabilis.*

HORTUS, INCORPORATED.

By the name in the title of this note, the "horticultural concession" at the World's Fair in New York is known. It is supported financially by the Horticultural Society of New York, the New York and Brooklyn Botanical Gardens, the Society of American Florists and the New York Florists' Club. The "concession" will include gardens of different types as well as flower shows, and the President of the Horticultural Society of New York suggests that many of our Fellows will wish to visit the concession during the World's Fair this summer. The President, Mr. HENRY F. DU PONT, writes that "it would be a great pleasure for the Horticultural Society of New York to show" to members of our Society "many of the private gardens in the vicinity of New York," and that he feels sure the Garden Club of America will be glad to facilitate the admission of our members to any garden.

"Hortus" will be next to the British Building in the World's Fair, and we shall be glad if any visiting the World's Fair, who desire to avail themselves of this cordial invitation, will communicate with the Secretary, R.H.S. Offices, so that arrangements may be made.

MASTERS MEMORIAL LECTURES, 1938.

THE BEHAVIOUR OF PLANTS.—I.

By F. J. CHITTENDEN, F.L.S., V.M.H.

[Read October 25, 1938; Mr E. A. BOWLES, M A., F.L.S., F.R.E.S., V.M.H., in the Chair.]

MY first contact with Dr. MASTERS, in whose memory the annual lectures I have this year the honour to give were established, was between forty and fifty years ago when he examined the Botany School in which I studied, and I recollect with pleasure the encouragement he gave me then and afterwards.

Dr. MAXWELL MASTERS was the son of a nurseryman and an eminent botanist who, as Editor of the Gardeners' Chronicle, worked continuously to integrate the results of scientific research with horticultural practice, and he lost no opportunity of encouraging young botanists to do the same, as he did me, a mere beginner.

Later again I had reason to be grateful for his help when I became a member of the Scientific Committee of our Society of which he was acting Chairman for so long, and again when in 1904 I followed Professor GEORGE HENSLOW as Secretary of that Committee.

He never became a member of the Council of this Society for he desired to keep an independent position in regard to it, but he often helped to guide its destinies from without, and in another way as Chairman of the Lindley Library Trust he conferred great benefits upon it.

Dr. MASTERS died in 1907 and left behind traditions of service which have benefited horticulture and are likely to benefit it still in years to come, and I am glad to have this opportunity of paying grateful tribute to his memory.

In those days we believed that the parts played by water, light, heat, and a few common chemical substances were comparatively simple. The simple tale was interesting enough, and the understanding of it gave a tool into the hands of the cultivator which was invaluable. With the passage of time we have learned that the tale is, after all, not so simple. The effects of these things upon the behaviour of plants are much more complicated than we then believed. Much more goes on behind the scenes than we dreamt of—perhaps much more than we can imagine even now.

Many plants are remarkable for the manner in which they are able to adapt themselves to the varied conditions of life and are able to grow, and flower, and increase their kind in seasons and in places that differ from one another in a great degree. Startling as these differences are, we should be more startled if we found our plants deviating from their regular routine to anything like the extent of our climatic deviations. Yet plants have proved remarkably sensitive to differences in environment, and it is of some of their responses to such differences I now wish to speak. Many of these responses have naturally been brought to the notice of our Fellows from time to time, and the first of those to which I would call attention arose out of Professor JOHANNSEN'S experiments with anæsthetics at Copenhagen over thirty years ago. I refer to these experiments for two reasons. First, I do not think the results he obtained have been made sufficient use of in horticulture hitherto. And next, these experiments link up with other matters of considerable importance.

We all know that in this country, and in all countries with a somewhat similar sequence of seasons, most plants pass through a period of apparent rest. This rest period is due in part to internal causes which we sum up in the phrase " It is the nature of the beast," and in part to external causes, as we see when we force plants into flower by altering the conditions surrounding them. We know, too, that for a while after entering into the rest period it is not easy to awaken them into growth, coax we never so subtly, and we know, or at least there is a widespread belief, that many will start more readily into growth if they have first been exposed to frost. This idea is frequently made use of by rhubarb forcers.

Professor JOHANNSEN found that exposure of dormant bushes of Lilac to the fumes of ether had an effect similar to that attributed to frost. Etherized plants could, by gentle forcing, be brought into flower earlier than those that had not been etherized but had otherwise been similarly treated. The difference in time of flowering might be as much as eight or ten days, but depended upon the distance of the time at which growth might naturally be expected to begin. I need not go into details; they are set out in our JOURNAL, vol. **28**, pp. 46, 47, and roughly they are these: The resting plants are placed in a chamber in an atmosphere of air and ether (1 oz. ether to 4 cubic feet of air) for 48 hours at a temperature of about 65° F. Chloroform has a similar effect, and since that time a considerable range of substances have been found to act in the same way on many different types of resting plants. In our own experiments made thirty years ago several woody plants, and, among other kinds, Rhubarb, Astilbes and Strawberries, were found to respond to the treatment.

A few years earlier a well-known fruit grower had suffered from a bad attack of big-bud in Black Currants, a trouble which could not then be controlled. He desired to ensure as far as possible that the cuttings he was about to put in were as free as possible from the mites, and consulted me regarding it. I found that while the mites would endure immersion in water for days on end without damage, a few minutes' immersion in a mixture of soft soap and sulphur (an old garden remedy for mites in Begonias) was fatal, and we concluded to try a bath of sulphur and soft soap. The season for planting cuttings was nearly over and the fruit grower was in a hurry, so he put some of the cuttings into the bath while it was still warm. He reported to me later that those cuttings that had had a warm bath began to grow days before those that had been dipped into the mixture when it was cold. I did not realize the significance of this observation at the time. But a year or two later Professor MOLISCH of Vienna reported that a warm bath had the same effect upon resting Lilacs, Forsythias, Ash, and so on, as ether. It wakened them out of their winter sleep. So, we found, did it act on, for example, Astilbes and Strawberries. Furthermore it proved that only the part of the Lilac branches, for instance, that was immersed in the warm bath was affected, and if one branch was so immersed, it, and it alone, would start into growth when forced out of the usual season.

In none of my attempts to rouse them early from their rest by the aid of ether or chloroform, or by the warm bath method, was I successful with Potatos or with Narcissi, Tulips or Hyacinths. I learned, however, two things which were of value later, viz. that it took a considerable time to warm up the interior of a moderate-sized Narcissus bulb to the temperature of the surrounding water, and also that temperatures which we can regard as only moderate, somewhere about 112° F., persisting for a few hours, were sufficient to kill a Narcissus bulb.

Although the warm bath at about 98° F. was capable of waking up Lilac and other plants, an air temperature of the same degree continued for the same time had no such effect.

The reason for this difference is not clear to me. It is well known that one of the effects of raising the temperature of a plant is an immediate increase in the rate of respiration. It is well known, too, that if free oxygen for respiration is not available to the plant, yet its protoplasm can and will obtain oxygen at the expense of breaking down its own substance—intramolecular respiration will occur. And there is little doubt that the chemical changes occurring in the cells will be different, although the temperatures are the same, when oxygen is freely available and when it is come by at the expense of destroying very complex materials in the cells. Free access of oxygen must necessarily be reduced when the temperature is raised for a plant for prolonged periods under water compared with one in the open air, and it is probable that something of this kind happens with the warm bath method. Indeed it is possible that the re-starting of growth is not directly due to the increased warmth of the bath at all, but rather to the production of some chemical in possibly minute quantities which has itself the power of starting the growth machine into motion.

That there are substances with such a power is known.

It has been found that if a potato tuber be cut into pieces and soaked in a solution of 1½ oz. sodium thiocyanate in one gallon of water for an hour and a half the eyes will immediately begin growth if placed in suitable conditions, but whether this or a related substance is necessary to activate the growth machinery of the potato bud in the normal way is not known. Still less is it known whether such substances are required in order to awaken plants generally from their winter sleep. If they are, as is probable, it is certain that the external conditions leading to their production in the plant differ widely between plant and plant, otherwise we should not see plants awaking at different seasons as they do.

Neither need we assume that if the development of such substances —we may perhaps call them plant hormones—is necessary, it is always the same substance in every plant.

Let us return to ascertained fact. The rapidity with which the flowers of the Lilac develop after the ether or warm bath treatment emphasizes the fact that those flowers are ready made in the bud long before they are due to appear, and this is true of a vast number of spring-flowering trees and shrubs and of many bulbs. Their behaviour as regards flowering does not depend alone, or even mainly, upon the weather in the spring. The beauty of the spring display is largely the result of the summer that is past, but not entirely. One is apt to think that because there is no great display of activity, everything is at a standstill. That is far from the truth. The dead-seeming bud or bulb is in fact the centre of great activity.

In the course of some experiments on pollination in apples and pears at Wisley some years ago, and also in connexion with some summer-pruning experiments with apples, it became desirable to ascertain when the flower elements were first formed and how far they had developed before their winter rest. Investigations were set afoot and, lo! it was discovered that there was scarcely any rest. The very beginnings of the flowers we found were laid down some time in July, and gradually development occurred, but they were far from complete at the time of leaf-fall in October. Growth and development still went on inside the bud until well into December, when it ceased, or almost ceased, for a short time, to be resumed about the end of January and continued until it was nearly time for the various parts that had been made to increase to their full size and open as the perfect flower. But before this increase occurred the whole of its parts had been perfected. Whether the cessation of development to which I have referred always takes place at the same season I do not know. We were unable to pursue our investigations long enough to make sure whether external conditions influenced the plant's behaviour in this respect; but the broad facts are there. The resting bud is not in a state of suspended animation—life and development are nearly always active in it. The past has still an active part to play in determining the present behaviour of the plant.

If I may pass for a moment from this matter of the development of flower buds to consider the behaviour of certain growth buds, it will be to throw an interesting light upon this very point.

We were making some experiments upon the summer pruning of apples, measuring the growth made after pruning on comparable trees after summer pruning at different times and to differing extents. The efficacy of summer pruning depends in a measure upon doing the work at such a time that only a small amount of growth follows. The general opinion was—and I think it still persists—that if a wet August and September follow the summer pruning, then more autumn growth is to be expected. But we found by comparing the growth made annually after summer pruning year by year, that it bore no relation to the autumn rainfall. It was as often small as large after a wet August and September. But we found it did bear a direct relationship to the rainfall of May and June—a result as useful for summer pruning practice as it was unexpected—though if we had properly considered a plant's behaviour it should not have been unexpected.

At any rate, we have here a guide to the time best for summer pruning—something we had not before : Do it early after a dry spring, later—even in the first fortnight of August—after a wet one. The behaviour of growth was found to be more dependent upon time past than upon the present weather conditions.

Now we may return to the behaviour of blossom buds, for several inquisitive persons have been examining them of late years and observing their behaviour in various conditions.

Perhaps the most interesting of these investigations, and of the greatest practical import, relate to bulbs, and these we owe mainly to the Dutch. It might be thought, and to a certain extent it is true, that the flowering time of Hyacinths, Tulips and Narcissi depends upon the time of planting and the temperature at which the plants are subsequently grown. The time of flowering depends upon the conditions also not only of the previous season of growth, but the conditions in which the bulbs have been kept after they were lifted and before they were planted.

It had been noticed that Hyacinth bulbs grown in the South of France generally flowered earlier when forced than did the same variety growing side by side with them from bulbs grown in Holland. Why was this ?

The flower buds of the Hyacinth have not begun to form at the time of lifting the bulbs. They begin to appear early in August at the growing point inside the bulb after the sixth leaf has developed. This, you see, is long after the bulb has ceased to show any appearance of growth, yet all the time changes have been going on within and preparations for flower-bud development have been advancing. From early August to the end of September the changes are rapid, and by late October the pollen grains are actually in process of formation. That is the normal course of events, and before this time in the ordinary way the bulbs will be again in the cool earth. But storage of the bulbs in abnormal temperatures was found to modify the subsequent growth and time of flowering profoundly.

I want again to emphasize this point of the influence upon future events of circumstances existing when the bulb is seemingly at rest.

Here are some of the facts. If the Hyacinth bulbs are stored for three months at a temperature below 55° F., no foliage leaves at all appear in the following spring, whereas if they are stored at 78° F., all the leaves develop well.

If, however, the first five or six weeks of storage are at 95° F. and this is followed by storage for four or five weeks at 65° F., after planting the leaves grow even more quickly, but the flower development at both low and high temperatures is retarded and even entirely prevented. Similarly root development is best after five weeks' storage at 95° F.

There thus appears a best temperature for each of the several different processes of leaf, root and flower development in the bulb, and the problem has been to find the best temperature to secure such a balance of development that all the parts of the plant may grow normally and yet produce flowers about Christmas instead of the normal April or May.

To cut a long story short, it appears that this can be done by keeping the bulbs for a few days after lifting at 90° F., then for five or six weeks at 78° F., then for three weeks before planting at 65° F.

After planting 55° F. is best, and the bulbs are kept in the dark until they are rooted and have made about 1½ inch of growth above the soil. Thereafter they are put into the light and air at about 75° F. until the flower spike shows, and finally kept at about 50° to 55° F. for the flowering.

The answer to the question I put as to the reason of the different time of flowering of Hyacinth bulbs grown in South France and in Holland seems to lie in the different temperature of the soils before lifting time, resulting in a different degree of development in the bulb when lifting takes place.

One might suppose that this dependence upon a relatively high summer temperature for the bulb is a consequence of its native home being in the warm Mediterranean region, and it may be so, but when the temperature relations of the Narcissus flower development are considered as well, this is a hypothesis that one would put forward with considerable diffidence.

Tulips differ in their behaviour. At the time of lifting there is no flower bud, nor are all the foliage leaves perfected in the bulb. These leaves develop only at normal temperatures, and not until all have been formed is it possible to hasten the development of the flower so as to be ready for early forcing. So with Tulips the raising of the temperature has to be deferred, care being taken to keep the bulbs first at a temperature suitable for the formation of the foliage leaves. Thereafter two or three weeks at 80° F. is the treatment.

Neither of these procedures has proved effective for the preparation of Narcissi for early forcing. With these the flower-bud formation takes a different course from that seen in either Hyacinths or Tulips. In Narcissi the young flower bud is already in process of formation in May before the bulbs have attained their growth. It is thus impossible to do much to influence the time at which flower-bud formation starts, and not until after the bulbs are lifted can any artificial influence be brought to bear.

It is of course recognized that there is a distinct difference in the time of flowering of bulbs gathered from different localities and planted in one place. For instance at Gulval, near Penzance, Cornish-grown bulbs of Narcissus 'Golden Spur' flowered twelve days earlier than those grown in Holland, 'King Alfred' fourteen days earlier, 'Scilly White' fifteen days earlier, and so on; and it is interesting to note that this influence of what one may call place of origin was not exhausted in the first year following transplanting, but continued in a modified degree for a year or two longer. One wonders whether this may be so long as any of the tissues already formed before transplanting took place remain, for formation of an entirely new bulb takes two or three years in a Narcissus.

We have seen how relatively high temperatures of 80° F. or so applied at the proper time encourage the development of the flower buds in the bulbs of the Hyacinth and Tulip, but, as though to emphasize the danger of generalizing from one or two instances, with Daffodils high temperatures not only do not encourage the development of the flowers in the bulb but on the contrary retard it. It has been found that bulbs which are stored after lifting in July at ordinary temperatures experienced in this country have their flower buds less advanced by September than are those of bulbs stored in a cool place.

Perhaps we have here the explanation of the difference between the behaviour of Cornish-grown bulbs and those grown in Holland to which I have just referred, for while the average winter temperature in Cornwall is several degrees higher than the average winter temperature of Holland, the summer temperatures are some degrees lower, and the bulbs are normally therefore less subject to high temperatures than in Holland and the flowers should be more advanced in the bulbs by September, as development will be more rapid during what I must call the resting period. I saw what appeared to be an interesting illustration of the probable influence of different soil temperatures on one of my visits to the Narcissus trials at Gulval. The bulbs were planted in beds running east and west, and the beds were raised somewhat above the paths, so that the southern edge of the bed caught the rays of the sun at a more direct angle than did the soil of the rest of the bed. The soil along this edge was therefore presumably warmer than that of the rest of the bed both in summer and winter, yet the bulbs along that edge of the bed flowered later than the rest. The summer heat had apparently retarded the development of the buds there. There seemed no other explanation.

Dr. VAN SLOGTEREN and his fellow-workers have shown that flower development in the bulb of the Narcissus goes on best at a temperature of about 48° F., that is, much below our average summer temperatures and more nearly that of an average November; so that while we may be content to let Nature's alchemy hold sway with our Daffodils for flowering in spring outdoors, if we want them very early—before Christmas, say—then storage at 48° F. from the beginning of August onwards will make them more ready, whereas, if we want them for ordinary forcing, storage for a fortnight or so in September at that low temperature is a help. But it is to be observed that even a few days at a high temperature after this low one may undo the work started, or rather stop it so that it will not recover for some time.

These examples of the early stages of flower development taken from three families of bulbous plants illustrate the fact that each kind of plant has its own peculiar way of growth, and we may go further and say that each variety of Narcissus may differ in some detail of development from every other. It is thus not possible yet, at any rate, to give details like a cooking recipe for the early forcing of Narcissi generally; it is possible to say that, as Dr. VAN SLOGTEREN has pointed out, too early cooling, too early lifting, too prolonged cooling may lead to " the flowers becoming small for the variety, and to the flower stalks becoming too long and too weak." Furthermore, as one might expect, the place and conditions of cultivation before lifting may call for a modification of storage conditions after lifting in order to obtain the best results.

These examples serve to show that events long prior to the appearance of the actual results are apt to affect the behaviour of plants profoundly.

Before I leave this question of the unseen developments going on inside the buds while they are apparently resting one further example may be given which was easily seen this last spring. Buds of apples may be subjected to very low temperatures without being adversely affected in the depth of winter, and they often are, but this year a succession of nights in April brought frosts, and these same buds, still unopened, were often so much damaged that, though the flowers opened, it was found that the ovules and sometimes the pollen grains which had developed inside in early spring had been destroyed and there was no hope of fruit production. Flowers of many other trees were similarly affected.

We must leave the matter of temperature effects and turn for a little while to another of the important conditions in the plant's environment, and its effect upon plant behaviour.

By the time referred to at the beginning of this lecture some amount of understanding had been reached regarding the remarkable power possessed by green plants of using light as a source of energy and their resulting power of using simple chemical substances from which to manufacture their own food (and incidentally that of every other living thing). Some other effects of light were also known and their value in the plant's behaviour more or less appreciated; but one had certainly not been realized.

Our American gardening friends not infrequently remark upon the earliness with which Dahlias begin to flower in England, compared with the neighbourhood of New York, and it is only within the past few years that a feasible explanation for this difference in behaviour has been forthcoming. It is clear that it cannot be that the plants enjoy a higher summer temperature here, for the contrary is true.

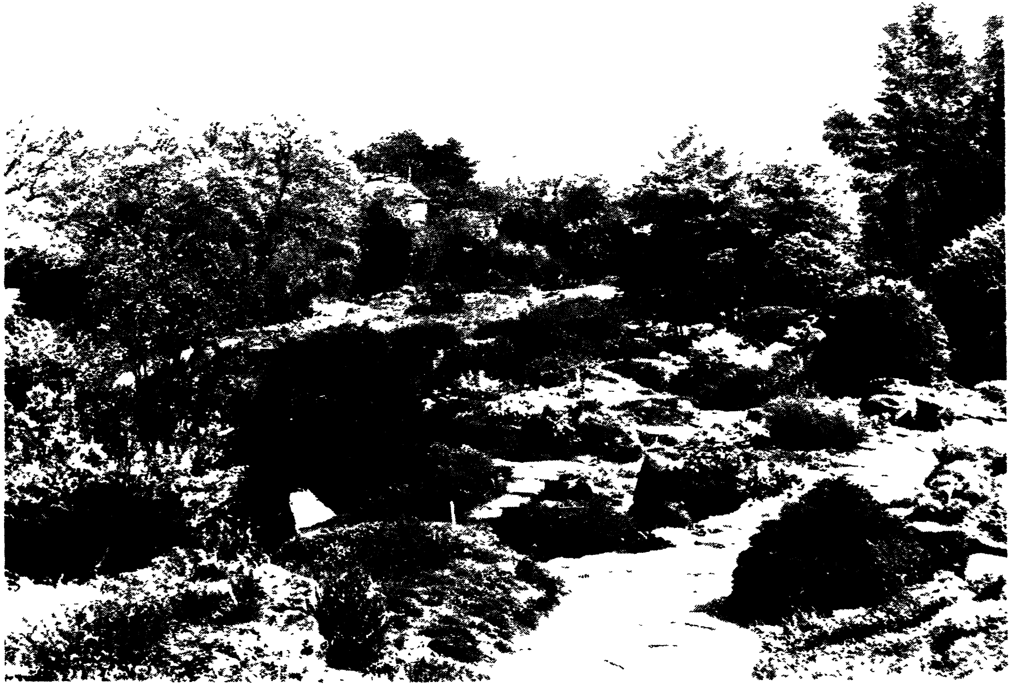

FIG. 1 THE ROCK GARDEN, WISLEY, IN MAY

To face p. 80

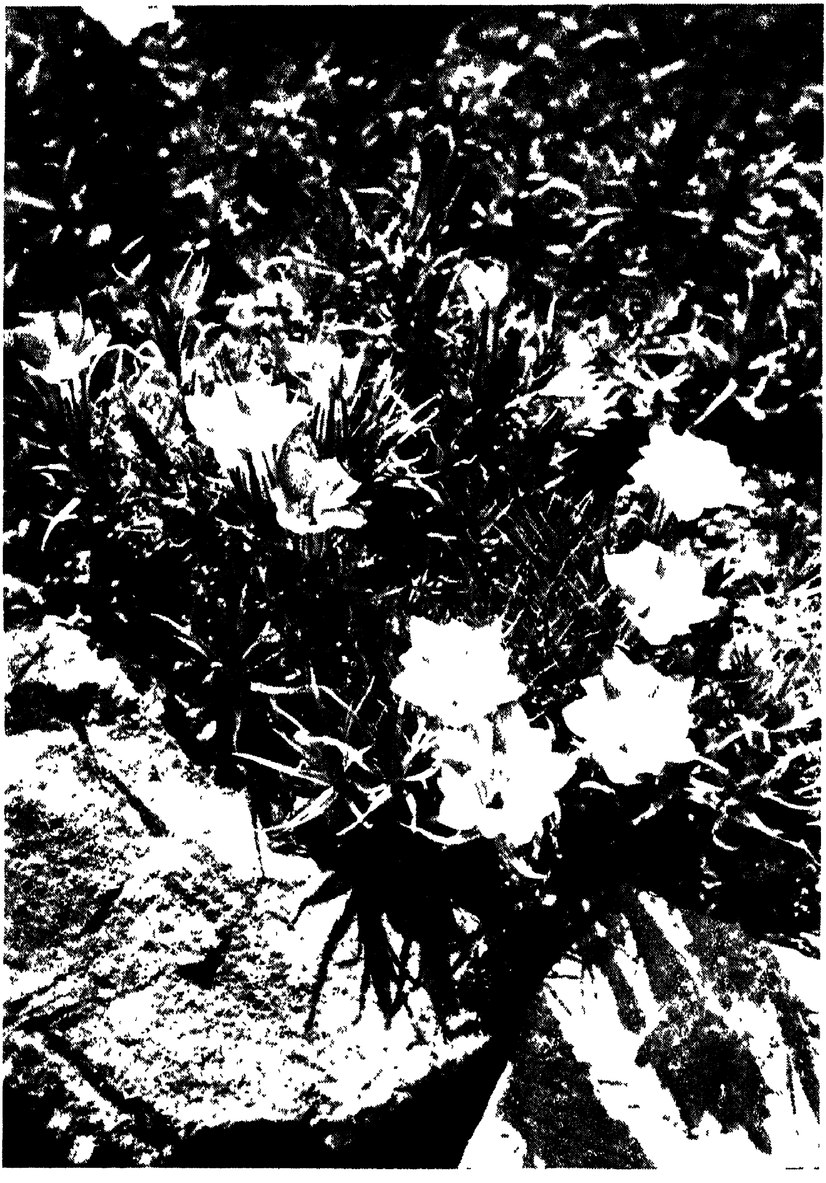

FIG. 2 GENTIANA × MACAULAYI IN MR. MUSGRAVE'S GARDEN

FIG. 3.—DELPHINIUM WELBYI AT WISLEY.

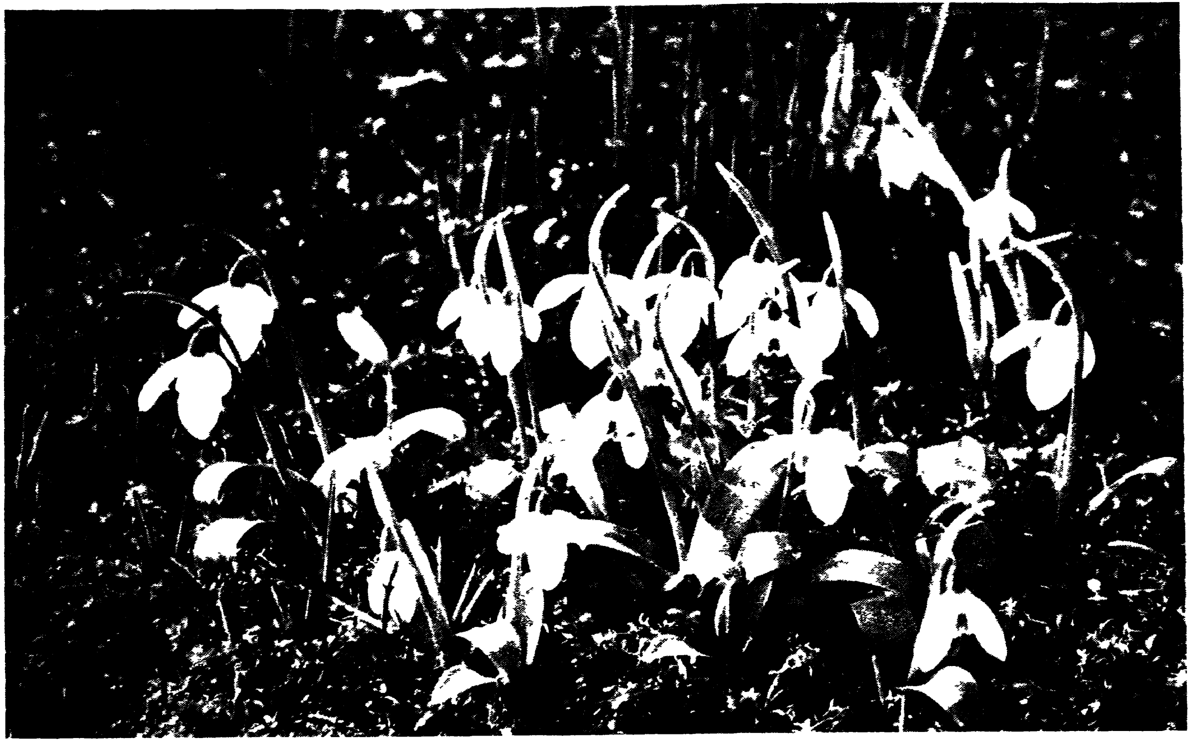

FIG. 4. GALANTHUS IKARIAE IN MR. MUSGRAVE'S GARDEN

[To face p. 81

Nor do they enjoy brighter sunlight, but they do grow under conditions of light differing between the two areas in another way.

New York lies more than 10° farther south than London—as far south indeed as Madrid—and as a consequence the daylight is markedly longer in winter and early spring than in the neighbourhood of London, and shorter in summer. Thus a Dahlia plant in the early days of its life in February and March will have both longer and brighter hours of daylight in New York than in London. Temperature here does not enter into the matter, for it can be controlled. Everyone who has of recent years visited the Chelsea Show will remember the groups of Dahlias in bloom and wonder perhaps how it is done. Mr. STUART OGG, who has so often shown that it can be done, tells me that the plants shown are old roots started in January into growth and grown steadily on. Cuttings struck early and grown on do not flower so soon. There may be a reason for this apart from the reason we should at one time have given, viz. that the plants grown from old roots had ample reserves of food to draw upon, whereas the cuttings had to make food as they went along; but, fascinating as the exploration of that path may be, we cannot attempt to follow it now, and would only say that there seems to be some evidence that considerable pieces of old plants used for propagation carry with them the accumulated results of past years—a matter at which I have already hinted in speaking of the behaviour of transplanted Narcissus bulbs.

These Dahlia plants have to pass through a period of days when the length of light is short, shorter than it would be in their native home in Mexico at the same period of the year, shorter than it would be in New York, and it seems that here at least part of the explanation lies. Comparatively short lengths of daylight hasten the flowering of the Dahlia, provided, of course, that daylight is long enough and strong enough to ensure the making of food. Length of daylight in this connexion does not necessarily mean length of bright sunlight, for light of only a few candle-power intensity often affects the time of flowering. Dahlias belong to the group of short-day plants, so does Cosmos, and early raising of seedlings so that they have a part of their early life with only short days results in early flowering, whereas if the raising of seedlings is put off to the longer days, so too is the flowering time put off—so late indeed, as it seemed when Cosmos was first introduced, as to make it scarcely worth while in this country. For these plants the flowering of which is hastened by relatively short exposures to light, artificial extension of the light period is of course detrimental if flowers are the object in view. But there are many plants that flower only after long periods of exposure to light, long-day plants, like the annual Chrysanthemums, the Hollyhock and the Antirrhinum, while others appear to be quite indifferent and flower equally well whether the day exposures be long or short. We cannot of course affect the last by changes in the length of time they are daily exposed to light, but by suitable shading or by artificial light we can alter the daily light ration for others and bring about acceleration or delay in flowering. It is not possible to prophesy what kind of plant will be best with short and what with long daily light rations, and different varieties of the same kind of plant respond differently to length of day. Much of our knowledge of this matter comes from America and especially the Boyce-Thompson Institute, but our JOURNAL contains records of experiments made by Dr. TINCKER on this point at Wisley, and he has also collected and published in Scientific Horticulture lists of plants which various experimenters have recorded as long-day, short-day and indifferent plants. The precise mechanism by which this response is brought about is still not understood, but the results illustrate again the point I have tried to illustrate all through, that the behaviour of a plant depends not only upon the circumstances of the moment, but largely upon what has happened in the past; things are going on internally of which we often have no visible evidence until long after the event, and if we seek to explain a plant's behaviour by something tangible in its immediate environment we may quite easily be completely misled. And I have said enough, although I have had to pass cursorily over the vast field I have sought to cover, to remind us that one kind of plant does not respond to external conditions in exactly the same way as another kind of plant. It is unsafe to reason from the particular to the general—even different varieties of the same species often behave differently under similar treatment, and to make them behave as we desire, even within their limitations, calls for all the knowledge that can be placed at his disposal, all the intelligence, all the skill and, shall I say, all the intuition of the most able cultivator.

GLADIOLUS GANDAVENSIS: ITS ORIGIN.

By ERNST H. KRELAGE, Hon. F.R.H.S.

IT is well known that the original *Gladiolus gandavensis* was put on the market by LOUIS VAN HOUTTE of Ghent. It was first announced in his catalogue No. 6, dated August 31, 1841, a small 8vo booklet of 38 pages, in the following terms (translated from the French): "I have just acquired the property of this Gladiolus, with the exception of two bulbs which are possessed by one of my colleagues. All Ghent comes to admire it even while I am writing these lines! As far as habit and colour are concerned, it leaves everything known among Gladioli far behind. Its size surpasses that of *G. ramosus*, its majestic blooms, seventeen to twenty in number, are of the brightest vermilion, the lower segments, being adorned with chrome yellow, amaranth and greenish moreover are beautified by the sky-blue anthers, decorating the centre of the flower."

The raiser was HERMANN JOSEPH BEDINGHAUS (1806–1884), then head gardener to the DUKE OF ARENBERG at Enghien in Belgium. On August 25, 1841, he offered his new Gladiolus to my grandfather ERNST HEINRICH KRELAGE (1786–1855) in a letter, which seems of sufficient interest to be reproduced here in extract in an English translation from the German text.

"NIMY, *August* 25, 1841.

"I beg to announce to you that I am established here on my own account.* At the same time I inform you that I raised this year 10 new superb Gladioli from seed, of which I add a description. They are wonderful; I had grown some in pots, that I sold at 50 francs each. Mr. VAN HOUTTE at Ghent bought 8 plants in bloom. Mr. VERLEEUWEN † at Ghent seeing some of these flowers, would have bought them, if he had not already ordered your own new Gladioli.‡

"Not knowing your seedlings, I send you my description. If you want one or more of these superb Gladioli, I can send them, either in October—because they are grown in the open ground—or in spring in pots, in which they also flower very well. Next year I may have over 50 distinct varieties of Gladioli in bloom, because many of my seedlings, all of which I crossed personally, are fit to flower next year.

* * * * * * *

"I want to receive from you the following Gladiolus species. If some of them might not have fine and large flowers, or if they are too expensive you may leave them out.

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* As a nurseryman at Nimy, near Mons (Belgium).

† A well-known nurseryman at Ghent.

‡ A series of *ramosus* seedlings raised by E. H. KRELAGE, offered in the catalogues of all leading firms of the period.

"*Gladiolus Watsonia, blandus, plantagineus, carneus, cuspidatus, imbricatus, hastatus,* (I like *latifolius* particularly), *augustus, edulis, rosea, Milleri, communis alba* and *rosea, byzantinus,* one of each; 25 *cardinalis,* provided of flowering size.

"I should like to have one good, flowering-sized bulb of *Gladiolus ramosus.* Here I can get it at 3 francs.

* * * * * * *

"If you happen to have some of your new Gladioli in bloom, please add a flower in paper, in order that I may see whether my seedlings are nearly the same as yours. I still have one bulb which is to flower this year; I could show it to you by sending you a flower, or send you a plant in pot to Frankfurt.* Within three weeks it may be in flower and perhaps you could sell there the plants I could furnish.

"This Gladiolus is truly fine and if you do not have something similar, you will never regret having seen it. I offer you the flowering plant for 10 Thaler, those flowering next year for 5 Thaler.

"P.S.—If you desire the flowering bulb and you might have already something similar, you may return it, because I can here sell as many as I have in flower, for 50 francs. I sell them in Belgium during two years to Mr. VAN HOUTTE at Ghent exclusively, but I am allowed to sell them in Holland and Germany.

"At Ghent much is talked about the new Gladiolus. RYFKOGEL † from Paris also saw it in bloom.

"*Description of the new superb Gladiolus which I raised from seed.*‡

"Stem 5 feet high, 2 feet above the foliage. Leaves sword-shaped, much ribbed, 3 feet long, 2 inches broad, grass-green, shining; slightly bordered red at the bottom.

"Flower spikes 2 feet long, ramified in three branches, two rows of flowers, turned to one side. Flower scarlet-red bell-shaped, nearly equal (segments), flower 4 inches long, 3 inches broad, the three upper segments each 1½ inch broad, the three lower segments 1 inch broad, inside yellow blotched, with red stripes in the centre. In the throat purple markings; the six incisions between the segments ending in purple stripes. Flower segments elliptical, spathe somewhat longer than the incisions; greyish-green, and reddish transparent.

"I count more than 60 large beautiful flowers on one spike and I possess a large bulb which furnishes more than 150 flowers. The flowers are of nearly double the size of that of *G. floribundus.*

"I possess 10 varieties more or less distinct in colours, particularly the lower segments are somewhat more blotched or striped. Some have deeper colours, in short, the differences are evident.

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* E. H. KRELAGE had a branch office at Frankfurt-on-Main, where he used to spend the last months of the year.

† A Paris nurseryman of Dutch origin.

‡ Evidently BEDINGHAUS when writing the letter did not yet know the name VAN HOUTTE had given it.

"I offer a good bulb flowering next year at 5 Thaler. This year I cannot furnish more than 6 to 8 varieties."

Unfortunately the copies of the letters sent in that period by E. H. KRELAGE have not been kept, and it is therefore impossible to give the reply he sent on September 4. The correspondence continued next year, and here is an extract of BEDINGHAUS's letter of August 20, 1842.

"Referring to last year's correspondence I inform you that I indeed had several beautiful Gladioli in flower and others still to come. By experiments I have succeeded in stating from what species *G. ramosus* * has been gained by SCHNEEVOOGT from seed, and I have the best proofs thereof. Although I never have got seeds from *G. ramosus*, I nevertheless have seedlings which are fully identical with *ramosus* in shape and size, one of them with 7 branches carrying over 60 flowers.

"*Gladiolus gandavensis* which I raised from seed last year, I sold this season still at 20 to 25 francs each, to florists who sell it at 30 to 40 francs. I can furnish you bulbs flowering next year at 6 Dutch florins each. You see that they are not expensive. I am ready to exchange them against other bulbs, and I will reserve the largest bulbs for you. In that case I should prefer *G. speciosus, formosissimus*, 'Unique rouge' † or some other varieties with red flowers, for I do not like the light and pale colours. I leave the selection to you, but you should not charge more than 5 francs for *formossisimus* and 'Rosamond,' ‡ for I can get flowering sized bulbs here at that figure.

"I will send you a description of my new Gladioli later; I cannot sell them this year, as they have not yet sufficiently increased."

Although BEDINGHAUS's letters are rather prolix, he carefully avoids to unveil the origin of his seedlings. VAN HOUTTE in his Flore des Serres 1846 named *cardinalis* and *psittacinus* as parents, but HERBERT § from his own experience declared *psittacinus* HOOK. and *oppositiflorus* HERB. to be the two species which had given birth to *G. gandavensis*. BAKER || contested this statement, which however seems rather acceptable, for *G. oppositiflorus* was known in the Holland bulb gardens as *floribundus*.

A third solution suggested by ALFRED C. HOTTES,¶ who considers *G. ramosus* crossed with *psittacinus* responsible for the origin of *G. gandavensis*, must be rejected, since we know from the above letter that BEDINGHAUS never obtained seeds from *G. ramosus*. There is no reason to doubt this assertion, just because he is far from communicative in other respects. Here again he omits any particulars about his experiment on the *ramosus* origin. It may be, however,

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* *G. ramosus* raised in 1828 by G. VOORHELM SCHNEEVOOGT at Haarlem from *floribundus*, the pollen plant being unknown, but supposed to be *cardinalis*.

† *Floribundus* varieties. ‡ *Floribundus* varieties.

§ In R.H.S. JOURNAL, 1847, page 89.

|| Handbook of the Irideae, page 228.

¶ Address, annual meeting of American Genetic Association, August 5, 1915.

that *psittacinus* was crossed with *ramosus*, and so amended, HOTTES's suggestion provides for a very acceptable solution.

In his next letter of November 23, 1842, he wrote :

" If you had not ordered the two *Gladiolus gandavensis* now, you could but have received them in March, as they would have been growing already. The varieties are No. 6 and 7, the latter being the best of all, which you should not sell.

* * * * * * *

" I rejoice already at the flowering of the other new Gladioli that I have got from you."

* * * * * * *

" NIMY, 9 *October* 1843.

"This year I raised many good Gladioli from seed, but unfortunately they have not sufficiently increased. I now possess some 50 seedlings, all resembling *ramosus*, but the colours are from pale and dark rose to white and pink. I therefore want 1 Gladiolus 'Unique rouge,' this is splendid ; please also add some three other thoroughly good reds, but not too expensive.

"I should like you to place some *G. gandavensis* which I can offer very cheap, 12 strong bulbs, that have flowered already, for 36 francs.

" I am offering you 3 or 4 of my seedlings in pale colours at 3 to 4 francs each. Some of them carried 50 flowers."

" NIMY, 6 *November* 1843.

" If Gladiolus 'Rosamond' is decidedly red, you may add it again, also *G. ramosus speciosus*, deep red. You may send in all 4 to 6 distinct good dark reds, or eventually 3, provided they are red and distinct and as strong as *ramosus*, in flowering sized bulbs at 2 florins or 2 fl. 50 c. I am writing you exclusively on account of the Gladioli and therefore want to have the rest of my order sent at the same time. If you cannot furnish the Gladioli, do not send the rest, and advise me."

" NIMY, 8 *September* 1844.

" I should like to receive some beautiful *Gladiolus ramosus* * as 'Prince of Wales' at 2 fl., 'Queen Victoria' at 2 fl., 'Prince of Waterloo' 2 fl., 'Prince Albert' 2 fl., 'Rouge éblouissant' 2 fl., 'Eclatante frappante' 2 fl. If you cannot furnish at these prices, send only 1 'Prince of Wales.' I bought already 'Wilhelmus,' 'Rouge unique' and 'Belvédère' at Ghent for fr. 1.50."

" NIMY, 20 *July*, 1846.

" I beg to offer undermentioned *Gladiolus gandavensis*, in very strong bulbs, at 6 francs per dozen, and 50 francs per 100. I should be obliged by your ordering some dozens, other nurserymen's prices being much higher. The following varieties are particularly beautiful, the flowers much larger than those of the common *gandavensis*: 'Le duc d'Arenberg,' 'La duchesse d'Arenberg,' 'Prince Englebert,' 'Princesse Marie,' 'Duc d'Ursel,' 'Linkii,' 'Prince Camille,' 'Prince Antoine,' 'De Candollei,' 'Klierianum,' 2 fr. each in strong bulbs. The following of my seedlings are exceedingly fine: 'Calliope,' *concinnus*, 'Gloire de Nimy,' 'Jucundus,' 'Mathilde,' *venusta*, *superbissimus*, *lilacinus*, a quite extraordinary colour, *amoenus*, *admirabile*, *Colvillei roseus*; I sold some of the best in Holland. They had seen the flowers at the Ghent flower show of 21 September 1845." *

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* Varieties of KRELAGE's *ramosus* assortment.

This is the last letter in which BEDINGHAUS speaks of his seedlings. I am unable to give particulars about his further Gladiolus career. Probably he stopped the raising of seedlings, since so many other successful raisers as SOUCHET in France, STANDISH in England and others yearly produced so many novelties of a high standard.

After the first announcement in 1841 VAN HOUTTE did not push *G. gandavensis* any more; in his next catalogues it occupies only one line quite unobtrusively, and he did not list any of BEDINGHAUS's newer seedlings. In his Catalogue No. 17 of October 1845, besides the original *gandavensis* he offered nearly 50 " New Dutch Hybrids of the *Gladiolus ramosus*" (chiefly KRELAGE's seedlings). He sold " those magnificent sorts in large bulbs."

BEDINGHAUS during his lifetime remained settled at Nimy, where he died on March 20, 1884, at the age of 78. He left a widow, MARIE EUGÉNIE FOUCART, and a son. His two daughters died before their father, in the prime of life.

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* This exhibit is not mentioned in the official list of awards of this show.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1938.

Carnation 'Royal Salmon.' A.M. November 29, 1938, as a show variety. Raised and shown by Messrs. Allwood Bros., Wivelsfield Nurseries, Haywards Heath, Sussex. A perpetual flowering variety of good habit with long stiff stems. Flowers freely produced, 3½ inches across, of good shape and substance, centre full, rich salmon ; calyx strong.

Chrysanthemum 'Duchess of Kent.' A.M. November 29, 1938. From Mr. H. Woolman, Shirley, Birmingham. A large well formed, delicate silvery-pink Japanese exhibition variety with pointed florets of medium breadth.

Chrysanthemum 'E. F. Hawes.' A.M. November 29, 1938. From Messrs. Keith Luxford, Sawbridgeworth. A very large Japanese exhibition variety with broad curled, bright-crimson florets which have a conspicuous golden reverse.

Cosmos atrosanguineus. A.M. November 8, 1938. From Messrs. Treseder, Truro. This Mexican plant is remarkable for the intense maroon colour of its flowers, which are about 2½ inches across, with eight overlapping, velvety petals and long, slender stalks. The same plant may be met with in gardens as *Bidens atrosanguinea* or *Dahlia Zimapani*, and it is well figured and described at t. 5227 of the Botanical Magazine as a variety of *Cosmos diversifolius.*

Crocus laevigatus albus. A.M. November 29, 1938. From G. P. Baker, Esq., Sevenoaks. *Crocus laevigatus* is a dainty late-flowering species from Greece and adjacent islands. It is somewhat variable in colour, the commoner forms having a white ground feathered and veined with purple. The bulbs of the beautiful albino form to which the award is given were collected by Mr. Baker in Crete.

Cypripedium × 'Hazel Hankey,' East Burnham var. A.M. December 13, 1938. The chief attraction in this flower is the round dorsal sepal, which is deep crimson-rose with purple shading near the base ; the petals and labellum are mahogany-red, bordered with greenish-yellow. The result of crossing *C.* × 'Hesketh' with *C.* × 'Mrs. Marling.' Exhibited by H. Barnard-Hankey, Esq., East Burnham Park, Bucks.

Cypripedium × 'Wendover.' A.M. November 29, 1938. This pleasing hybrid has a round dorsal sepal heavily marked with confluent rich purplish-crimson spotting. The lateral petals and labellum are yellowish, stained with mahogany-red. It results from the crossing of *Cypripedium* × 'Atlantis' with *C.* × 'John Henry.' Exhibited by H. Bernard-Hankey, Esq.

Dendrobium × 'Louis Bleriot' var. 'Illustrious.' A.M. November 29, 1938. This hybrid possesses a robust constitution. The tall plant carried three spikes with numerous flowers, the petals and

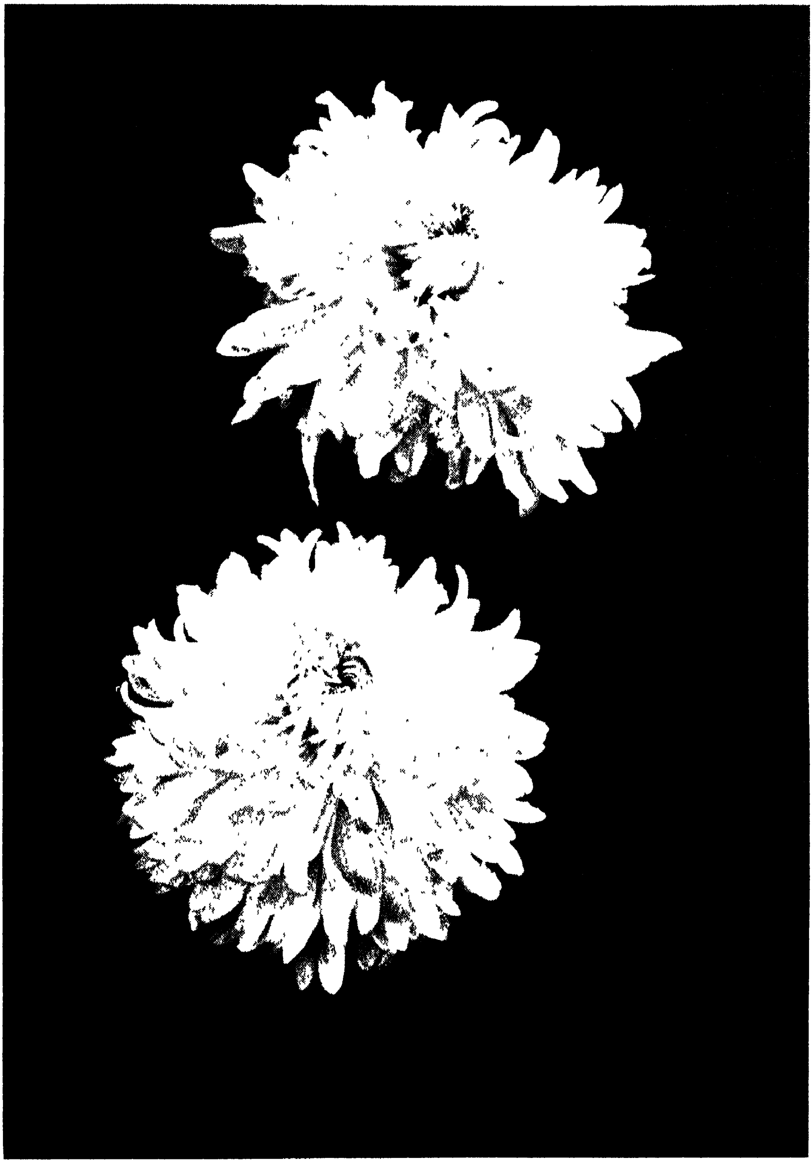

FIG. 5 CHRYSANTHEMUM 'ALABASTER'
A.M. 1938 (p. 90)
Flowers white

[To face p. 88

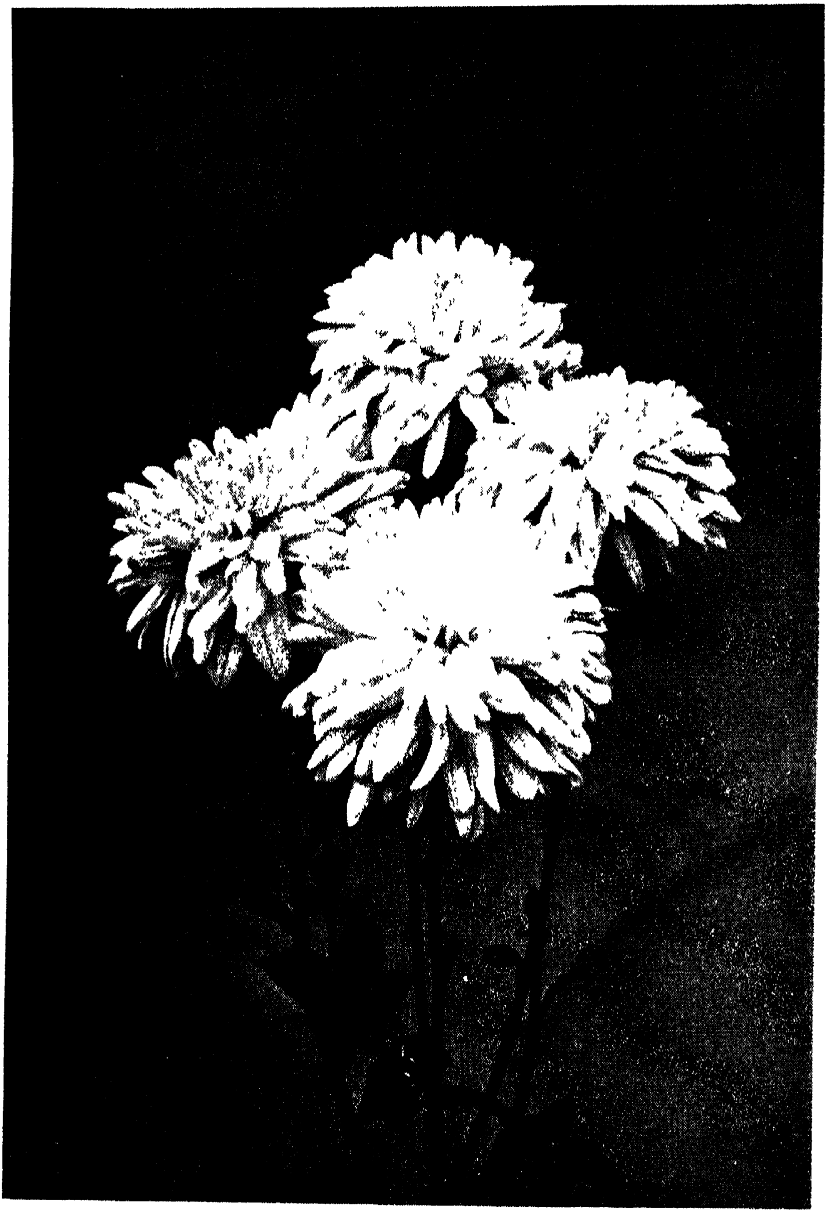

FIG. 6 CHRYSANTHEMUM 'GOLDEN GEM'
A.M. 1938 (p. 92)
Flowers yellow, tinged orange

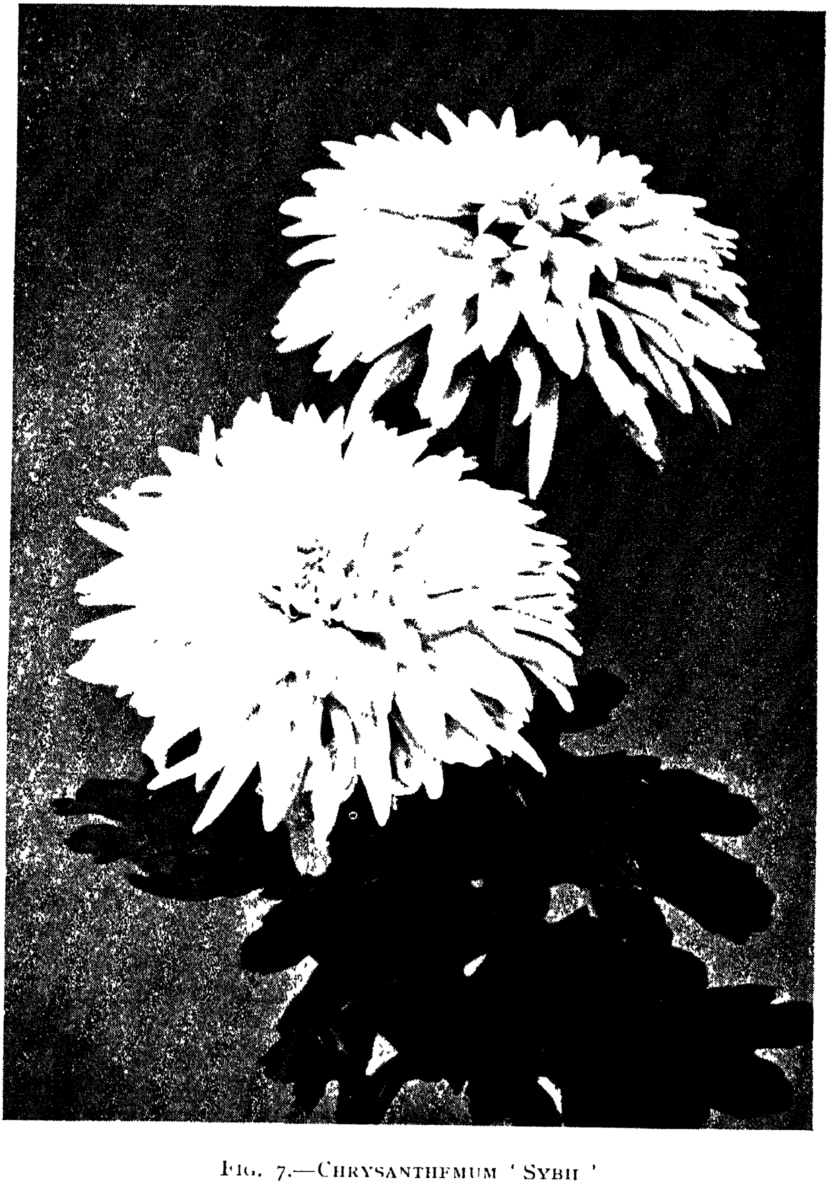

FIG. 7.—CHRYSANTHEMUM 'SYBIL'
F.C.C. 1938 (p. 93)
Flowers soft cream-pink, inner petals shaded apricot

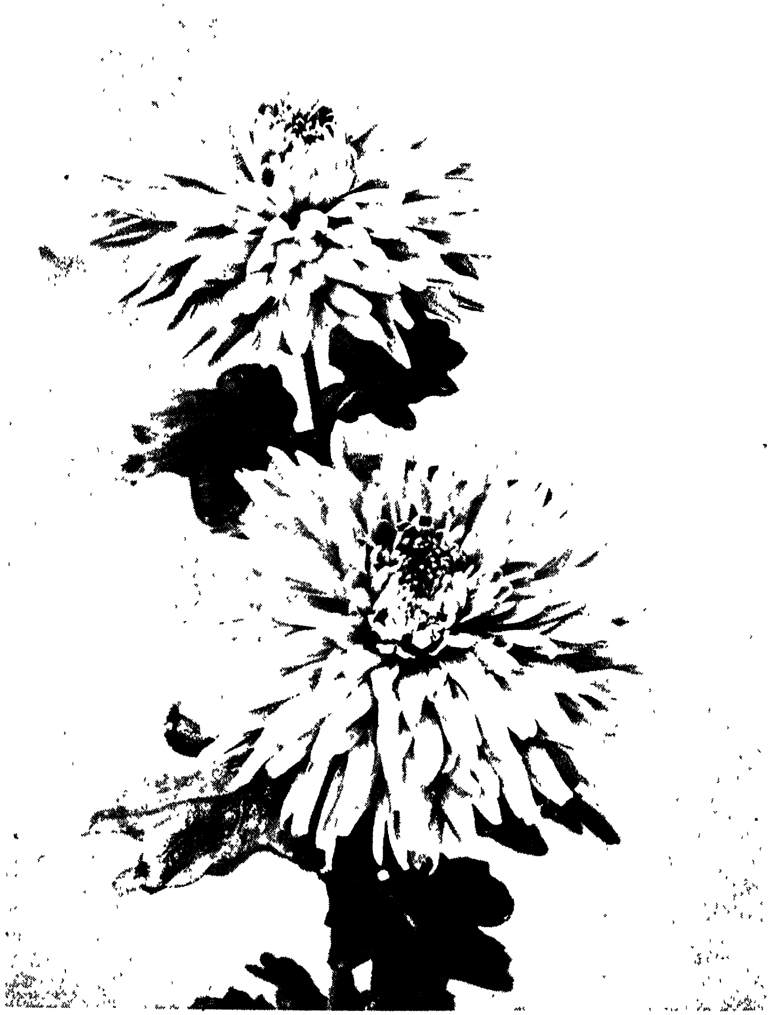

FIG 8 CHRYSANTHEMUM 'HARMONIOUS'
A.M. 1938 (p 95)
Flowers bright golden-amber

[*To face p* 89

all the segments deep-rose shaded with purple. It was obtained by crossing *D. Phalaenopsis* var. *Schroederianum* with *D. superbiens*. Exhibited by Messrs. Sanders, St. Albans.

Hippeastrum 'Snow White.' A.M. November 8, 1938. From R. F. W. Cartwright, Esq. (gr. Mr. E. Humphris), Aynho Park, Banbury. A good white variety, with a touch of green at the base of the segments.

Luculia gratissima. A.M. December 13, 1938. From Messrs. L. R. Russell, Windlesham. This attractive shrub was introduced from the temperate Himalaya in 1823 and is still one of the most valuable cool greenhouse plants for winter flowering. In cultivation it forms a well-branched bush of medium size with elliptical, shortly-acuminate leaves. The pale rose or flesh-coloured flowers are carried in large, rounded, terminal panicles and are most agreeably scented. An unusually fine specimen is figured at t. 3946 of the Botanical Magazine.

Ornithogalum Saundersiae. A.M. November 29, 1938. From Lionel de Rothschild, Esq., Exbury. A very handsome, late-flowering bulbous plant for the cool greenhouse. The large leaves are sword-shaped and somewhat glaucous ; the flowers, which are 1 inch across, are ivory-white with glistening greenish-black ovaries, and are borne in a many-flowered, corymbose raceme on a stout scape 2–3 feet high.

EARLY-FLOWERING CHRYSANTHEMUMS TRIED AT WISLEY, 1938.

Two hundred and thirty stocks of Early-flowering Chrysanthemums, representing two hundred and twenty-two varieties, were grown at Wisley in 1938. These had been selected by the Joint Early-flowering Chrysanthemum Committee as representative varieties of the various colours and early-flowering types at present available.

Six unrooted cuttings of each stock were received in early February 1938. These when rooted were potted singly into 3½-inch pots, later transferred to 5-inch pots, from which they were planted into their flowering quarters on May 17, 1938. The plants, after the normal stopping, did not grow vigorously from the start, and it was found necessary to cut them back to encourage new basal growth. After this treatment the plants grew satisfactorily and flowered well in spite of the somewhat abnormal conditions which prevailed during the growing period. Some varieties were grown naturally, no disbudding being done; others were disbudded, one flower being allowed to develop on each main growth (see below).

The trial was inspected by the Joint Early-flowering Chrysanthemum Committee of the Royal Horticultural Society and the National Chrysanthemum Society, which made recommendations for Awards, the final inspection of the trials being made during the last week in September. As the season was somewhat abnormal, especially in the South, the times of flowering of the awarded varieties have not been indicated, as it is thought this might be misleading. All the varieties which received Awards were in full flower before the last week of October.

The varieties are divided into colour groups in the report.

An asterisk (*) following the name of a variety indicates that it was disbudded. When no asterisk appears the variety was grown without disbudding and allowed to flower as sprays. A few varieties were grown in both ways, and when such a variety received an award this is indicated in the notes below.

DESCRIPTIONS AND NOTES.

Flowers White.

Alabaster* (raised and sent by Mr. H. Shoesmith, Mayford, Woking). **A.M.** September 21, 1938, as a disbudded variety for cutting and garden decoration.—3 feet. Foliage small; flower stems 18 to 30 inches long. Flowers 5 inches, disbudded, somewhat incurved, white. (Fig. 5.)

Felicity* (raised and sent by Messrs. J. and T. Johnson, Tibshelf, Derbyshire). **A.M.** September 29, 1938, as a disbudded variety for cutting.—3½ feet, very vigorous. Flower stems 18 to 24 inches long. Flowers 5 inches, disbudded, inner florets erect, outer somewhat drooping, white.

Hillcrest White* (raised by Mr. C. T. Kipping and sent by Mr. H. Woolman, Shirley, Birmingham). **A.M.** September 21, 1938, as a disbudded variety for cutting and garden decoration.—2 feet. Flower stems 12 to 15 inches long. Flowers 4 inches, disbudded, somewhat incurved at the centre, creamy-white.

Lettice (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 29, 1938, as a spray variety for garden decoration.—2 feet. Flower stems 9 to 12 inches long. Flowers 5½ inches, in sprays, somewhat incurved; florets semi-rolled, creamy-white.

Pluie d'Argent (sent by Mr. H. Woolman). **A.M.** September 7, 1938, as a garden variety for the border.—15 inches, of compact habit. Flower stems 6 inches long. Flowers 3 inches, in sprays, produced in succession, white. (**A.M.** 1914.)

Polar Snow* (raised and sent by Mr. E. Riley, Brookside Nurseries, Alfreton, Derbyshire; also sent as 'Daily Record' by Mr. W. H. Cole, Sarisbury Court Nurseries, Southampton). **A.M.** September 21, 1938, as a garden variety.—20 inches. Flower stems 12 to 15 inches long. Flowers rounded, 3½ inches diameter, disbudded; florets incurved, white.

Sanctity* (raised by Mr. J. W. Scott and sent by Mr. J. B. Stevenson, Colham Green Nurseries, Hillingdon, Middlesex). **A.M.** September 29, 1938, as a disbudded variety for cutting.—2½ feet. Flower stems 18 to 24 inches long. Flowers rounded, 4½ inches diameter, disbudded, white. Also known as 'Candida.'

Snowfall (raised and sent by Mr. H. Shoesmith). **A.M.** September 7, 1938, as a garden variety.—2 feet. Flower stems 9 to 15 inches long. Flowers 3 to 3½ inches diameter, in sprays; florets stiff and hard, white.

Tibshelf White* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 21, 1938, for garden decoration.—Plant 2½ feet tall, with 18-inch long flower stems. Flowers 5 inches diameter, disbudded; florets somewhat drooping, white.

White Lady* (raised and sent by Mr. H. Shoesmith). **A.M.** September 21, 1938, for garden decoration and, disbudded, for cutting.—3 feet. Flower stems 18 to 24 inches long. Flowers 5 inches diameter, disbudded; florets stiff, somewhat drooping, semi-rolled, white centre tinged cream.

Arctic Circle* (raised and sent by Messrs. J. and T. Johnson). **H.C.** September 7, 1938, for garden decoration.—1½ foot. Flower stems 12 to 14 inches long. Flowers 3½ to 4 inches diameter, disbudded, incurved, white.

The following varieties were grown in the trial and are retained for future judgment:

Border White (Johnson)	Mayland White* (Avery)
Chastity* (Johnson)	Mary Colvin* (Thyne)
Debutante*, syn. Elsenham White (Scott)	White Splendour* (Thorpe)
Floramead (Thorpe)	White Spray (Johnson)

Flowers Cream.

The following varieties were grown in the trial and are retained for future judgment:

Cranford Cream (Roots)	Lichfield Cream (Thorpe)

Flowers Yellow.

Dignity* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 21, 1938, for garden decoration.—2½ feet. Flower stems 12 to 18 inches long. Flowers 4½ inches diameter when disbudded; florets semi-rolled, bright pale yellow.

Golden Gem (raised by Mr. W. Avery, introduced by Mr. C. F. Kipping and sent by Messrs. Isaac Godber, Wellington Nurseries, nr. Bedford). **A.M.** September 7, 1938, as a spray variety.—2 feet. Flower stems 12 to 15 inches long. Flowers 2½ inches in sprays, bright yellow centre tinted golden-orange. (Fig. 6.)

George MacLeod* (raised and introduced by Mr. A. Aitchison and sent by Messrs. Torrance and Hopkins, Meadow Nurseries, Busby, nr. Glasgow). **A.M.** September 29, 1938, as a disbudded variety for cutting.—3 feet. Flower stems 18 to 24 inches long. Flowers 5 inches when disbudded, incurved, bright golden-yellow. Sport from 'Bronze Early Buttercup.'

Herbert Sutcliffe* (raised and introduced by Mr. H. Woolman and sent by Messrs. W. N. Hall, West Heddon Nurseries, Heddon-on-the-Wall, Newcastle-on-Tyne; also sent by the same senders as 'Yellow Buttercup'). **A.M.** September 21, 1938, for garden, and disbudded for cutting.—3 feet. Flower stems 18 to 24 inches long. Flowers 5 to 6 inches when disbudded, incurved, bright golden-yellow. Sport from 'Bronze Early Buttercup.'

Primrose Circle* (introduced by Mr. C. T. Kipping and sent by Messrs. Torrance and Hopkins). **H.C.** September 7, 1938, for garden decoration.—1½ foot. Flower stems 12 to 14 inches long. Flowers 3½ to 4 inches when disbudded, primrose-yellow. Sport from 'Arctic Circle.'

Primrose Record* (raised and sent by Mr. E. Riley). **A.M.** September 21, 1938, for garden decoration.—18 inches. Flower stems 12 to 14 inches long. Flowers rounded, 3½ inches when disbudded, primrose-yellow. Sport from 'Polar Snow.'

Sunbeam* (raised by Mr. H. Shoesmith and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, for garden decoration and disbudded for cutting.—2½ feet. Flower stems 18 inches long. Flowers 4½ inches when disbudded, bright rich golden-yellow.

The Ashes (raised by Mr. W. T. A. Roots and sent by Messrs. A. G. Vinten, Oldland Nurseries, Balcombe, Sussex). **A.M.** September 21, 1938, as a spray variety.—2½ feet. Flower stems 9 to 15 inches long. Flowers 3½ to 4 inches, in sprays; florets rolled, bright golden-yellow.

The following varieties were grown in the trial and are retained for future judgment:

Balcombe Gold* (Vinten)
Cranford (Roots)
Daffodil* (Shoesmith)
Early Romance* (Johnson)
Gold Charm* (Johnson)
Gold Peak* (Johnson)
Gold Standard* (Johnson)
Goldfinder*, syn. Hollicot Yellow (Roots)
Harlow*
Harvest Glory*
Harvest Gold* (Johnson)
Harvest Moon* (Woolman)
Kingcup* (Forsyth)
Lemon Excel* (Lowe)
Miss Irene Torrance* (Torrance)
Mrs. Cissie Biggam* (McAlpine)
Mrs. Frank Mason* (McAlpine)
Mrs. W. D. Cartwright* (Shoesmith)
Nita* (Avery)
Orange Queen* (Kipping)
Peveril* (Johnson)
Rosenneath Bedder
Sunny Charm* (Johnson)
Sussex Gold (Thorpe)
Yellow Lichfield Cream (Thorpe)

Flowers Cream-pink.

The following variety was grown in the trial and is retained for future judgment:

Perle Chatillonaise (Nonin)

Flowers of Pink Shades.

Sybil* (raised and introduced by Mr. H. Shoesmith and sent by Messrs. W. N. Hall). **F.C.C.** September 21, 1938, as a disbudded variety for cutting and garden decoration.— 2½ feet. Flower stems 18 inches long. Flowers 4½ inches diameter when disbudded; florets rolled, stiff, soft cream-pink, inner shaded apricot. (Fig. 7.)

Baby Royal (raised and sent by Mr. A. W. Thorpe, Lichfield). **A.M.** September 21, 1938, for garden decoration.—18 inches. Flower stems 6 to 9 inches long. Flowers 3 inches diameter, in sprays, soft rose-pinkish apricot.

Freda* (raised and sent by Mr. H. Shoesmith). **A.M.** September 21, 1938, as a disbudded variety for cutting.— 3 feet. Flower stems 18 to 24 inches long. Flowers 4½ to 5 inches when disbudded; florets semi-rolled, bright rose-pink.

Pink Precôce* (raised by Mr. T. Stevenson and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, as a spray, for cutting and garden decoration variety.— 2 feet, very free-flowering. Flower stems 12 to 15 inches long. Flowers 4½ inches when disbudded, bright soft pink, centre shaded apricot when young. Sport from 'Rose Precôce.'

Rosy Morn (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 7, 1938, for garden decoration.— 20 inches. Flower stems 6 to 9 inches long. Flowers 3½ to 4 inches diameter, in sprays, rose-pink, inner florets shaded apricot-salmon when young.

Suzy* (raised and sent by Mr. R. Paine, Partwick Nursery, Henfield, Sussex). **H.C.** September 29, 1938, for garden decoration.-20 inches. Flower stems 12 to 15 inches long. Flowers 4 inches when disbudded, rose-pink.

The following varieties were grown in the trial and are retained for future judgment :

Alana* (Thorpe)
Alecto* (Thorpe)
Alpink (Thorpe)
Coronation* (Riley)
Elite* (Shoesmith)
Forward* (Johnson)
Juliana* (Thorpe)
Leda* (Johnson)
Modesty (Shoesmith)
Pink Circle (Thorpe)
Pink Domino
Pink Gem (Avery)
Pink Profusion (Scott)
Pink Prolific (Thorpe)
Pink Reward* (Johnson)
Rose Princess* (Johnson)
Shirley Lilac* (Woolman)
Shirley Pride (Woolman)
Silver Queen* (Woolman)
Sincerity* (Johnson)
Stella* (Shoesmith)
Youth* (Johnson)

Flowers of Rose Shades.

Charnwood* (raised by Messrs. Johnson and sent by E. T. Thistlethwaite, Esq., Chesterfield Road, Barnet, Herts.). **A.M.** September 21, 1938, for garden decoration.– 2¼ feet. Flower stems 14 to 18 inches long. Flowers 4 inches when disbudded, bright rose.

Rose Precôce (raised by Mr. J. Barrell, introduced by Mr. T. Stevenson and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, for garden decoration, as a spray variety and disbudded for cutting.– 2 feet, very free-flowering. Flower stems 12 to 15 inches long. Flowers 4 inches diameter, in sprays, bright rose.

The following varieties were grown in the trial and are retained for future judgment :

Helen Thorpe* (Thorpe)
Matador* (Forsyth)
Mrs. Percy Beer (Woolman)
Mrs. Webber*
Rosalinde* (Woolman)
Sarah Knight* (Shoesmith)

Flowers of Salmon Shades.

Althorpe* (raised and sent by Mr. A. W. Thorpe). **A.M.** September 21, 1938, for garden decoration.—2½ feet, very free-flowering. Flower stems 12 to 20 inches long. Flowers 4 to 5 inches when disbudded, light rosy-salmon centre shaded apricot.

Dawn* (raised and sent by Mr. H. Shoesmith). **A.M.** September 21, 1938, for garden decoration and disbudded for cutting.—2¼ feet. Flower stems 18 inches. Flowers rounded, 4½ inches when disbudded ; florets stiff, soft creamy salmon-pink, centre tinted old gold.

Gertrude* (raised and sent by Mr. H. Shoesmith). **A.M.** September 7, 1938, as a disbudded variety for cutting.— 2 feet. Flower stems 14 to 16 inches long. Flowers 4½ inches when disbudded ; florets rolled, bright salmon-pink, centre shaded apricot.

Salmon Precôce* (raised by Mr. T. Stevenson and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, for garden decoration, as a spray variety and disbudded for cutting.—2¼ feet, very free-flowering. Flower stems 15 to 18 inches long. Flowers 4½ inches when disbudded, bright rosy-salmon.

The following varieties were grown in the trial and are retained for future judgment :

Gladness* (Thorpe)
La Garonne (Nonin)
Mrs. A. W. Thorpe (Thorpe)
Salmon Freda* (sport from 'Freda')
Salmon Profusion (sport from 'Pink Profusion')
Salmon Queen* (Woolman)
Sylvia* (Shoesmith)

Flowers Fawn.

Shirley Fawn* (raised and sent by Mr. H. Woolman). **A.M.** September 21, 1938, for garden decoration.—2½ feet. Flower stems 18 to 22 inches long. Flowers 4½ inches diameter when disbudded, light fawn.

The following variety was grown in the trials and is retained for future judgment:

Apricot Delight* (Cole)

Flowers of Amber Shades.

Harmonious* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 7, 1938, as a disbudded variety for cutting.—2½ feet. Flower stems 12 to 18 inches long. Flowers 4½ inches diameter when disbudded, bright golden-amber. (Fig. 8.)

The following varieties were grown in the trials and are retained for future judgment:

Alex. McAlpine (McAlpine)
Inez Ritchie (McAlpine)
Mrs. Peter Wilson
Mrs. Q. Macfadyen
Remanque* (J. J. Thorpe)
Saracen

Flowers of Bronze Shades.

Annie S. Little (raised and introduced by Mr. W. Little and sent by Messrs. Torrance and Hopkins). **A.M.** September 7, 1938, for garden decoration.—16 inches, of compact bushy habit. Flower stems 9 to 12 inches long. Flowers 3½ inches diameter, in sprays, orange-bronze. (Fig. 9.)

Bronze Precôce* (raised and introduced by Mr. T. Stevenson and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, as a spray, disbudded for cutting and garden decoration variety.—2¼ feet. Flower stems 15 to 18 inches long. Flowers 4½ inches diameter when disbudded, rich terra-cotta bronze. Sport from ' Rose Precôce.'

Egypt* (raised and introduced by Mr. H. Shoesmith and sent by Messrs. W. N. Hall). **H.C.** September 29, 1938, for garden decoration.—2 feet, of compact bushy habit. Flower stems 12 to 15 inches long. Flowers 4 inches diameter when disbudded, bright orange-bronze, reverse old gold.

Mrs. Jack Pearson (raised and introduced by Mr. F. Ladds and sent by Messrs. A. G. Vinten). **H.C.** September 7, 1938, as a spray variety.—2¼ feet. Flower stems 9 to 15 inches long. Flowers 3 inches diameter, in sprays, bright orange-bronze.

Orange Glow* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 29, 1938, for garden decoration.—2½ feet, of erect habit. Flower stems 18 inches long. Flowers rounded, incurved, 4½ to 5 inches diameter when disbudded, rich orange-bronze, reverse old gold.

September Glory* (raised and introduced by Mr. W. T. A. Roots and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, for garden decoration.—3 feet. Flower stems 18 to 24 inches long.

Flowers 4 inches diameter when disbudded, inner florets incurved, outer reflexed, bright orange-bronze.

Utopia* (raised, introduced and sent by Mr. H. Shoesmith). **A.M.** September 29, 1938, for garden decoration and disbudded for cutting.—2 feet. Flower stems 15 to 18 inches long. Flowers 5 inches diameter when disbudded, orange-bronze, reverse bright old gold.

Wendy (raised and introduced by Mr. H. Shoesmith and sent by Mr. J. B. Stevenson). **A.M.** September 21, 1938, as a spray and for garden decoration variety.—2½ feet. Flower stems 15 to 18 inches long. Flowers 3½ inches diameter, in sprays, rich orange-bronze.

The following varieties were grown in the trials and are retained for future judgment:

A. E Cooper
Alfreda* (Sapsford)
Chamois* (Shoesmith)
Deep Bronze Freda* (Sapsford)
Edina*
Gloriana* (sport from 'September Glory')
Golden Phoenix (sport from 'Phoenix')
Harvester*
Hillcrest Bronze* (Kipping)
Hollybank Bronze* (J. J Thorpe)
James Moody (A. W. Thorpe)
Lucius* (Shoesmith)
Mayland Bronze* (Kipping)
Midnight Sun* (Lowe)
Mrs. Wm. Whyte* (Whyte)
Orange Pet (Nonin)
Query* (J. J. Thorpe)
Tibshelf Glory* (sport from 'Orange Glow' (Johnson)
Trigo* (Kipping)
Winnie Avery *
Woking Bronze* (Shoesmith)

Flowers of Red-bronze Shades.

Bronze Beauty* (raised, introduced and sent by Mr. H. Shoesmith). **A.M.** September 21, 1938, for garden decoration.– 2 feet. Flower stems 18 inches long. Flowers 5 inches diameter when disbudded, rich scarlet-bronze, reverse bright old gold.

Dorothy Maguire* (raised and introduced by Messrs. J. and T. Johnson and sent by Mr. E. T. Thistlethwaite). **A.M.** September 21, 1938, for garden decoration.—2 feet, of bushy habit. Flower stems 12 to 15 inches long. Flowers 3½ inches diameter when disbudded; florets rolled, reddish-bronze, old gold reverse.

Mrs. Phil Page (raised and introduced by Mr. F. Ladds and sent by Messrs. A. G. Vinten; also sent by Messrs. Isaac Godber, Wellington Nurseries, nr. Bedford). **H.C.** September 7, 1938, as a spray variety.—2½ feet. Flower stems 9 to 15 inches long. Flowers 3 inches in diameter, in sprays, reddish-bronze.

The following varieties were grown in the trials and are retained for future judgment:

Ben* (Paine)
Bonna Hanna (Boness)
Bronze Early Buttercup*
Chestnut Gem (Vinten)
Chestnut Glory* (Stevenson)
Dictator* (Johnson)
Hazelmere (Kipping)
John Wearing* (Shoesmith)
Tancred Gem* (sport from 'Mrs. Phil Page')

Flowers of Red Shades.

Mayland Flame* (raised and introduced by Mr. C. T. Kipping and sent by Mr. H. Woolman). **A.M.** September 21, 1938, for garden

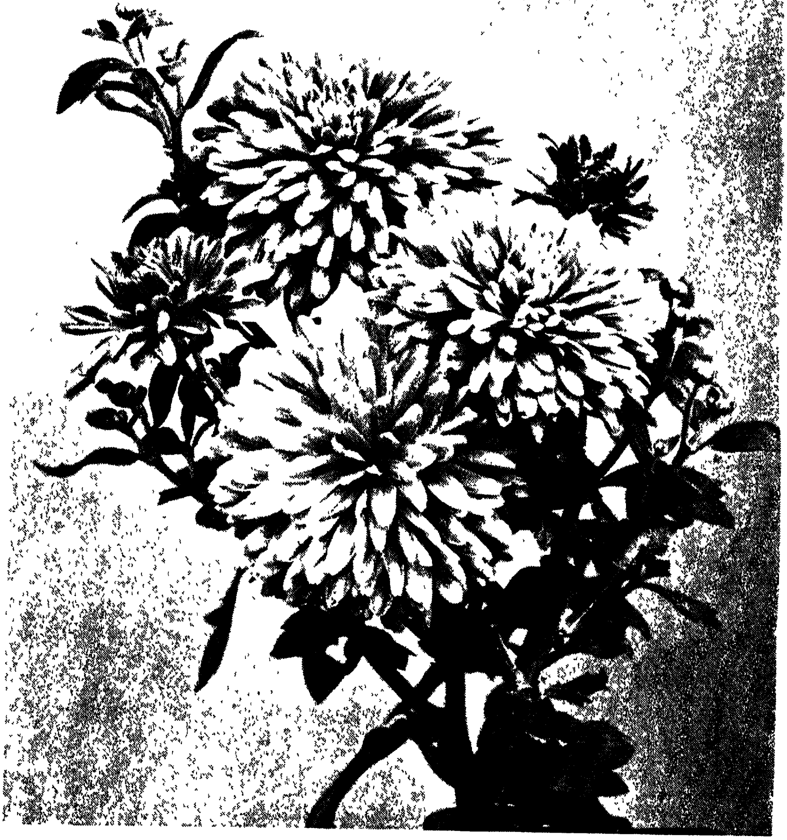

FIG. 9. CHRYSANTHEMUM 'ANNIE S. LITTLE.'
A.M. 1938 (p. 95)
Flowers orange-bronze

[*To face p.* 96

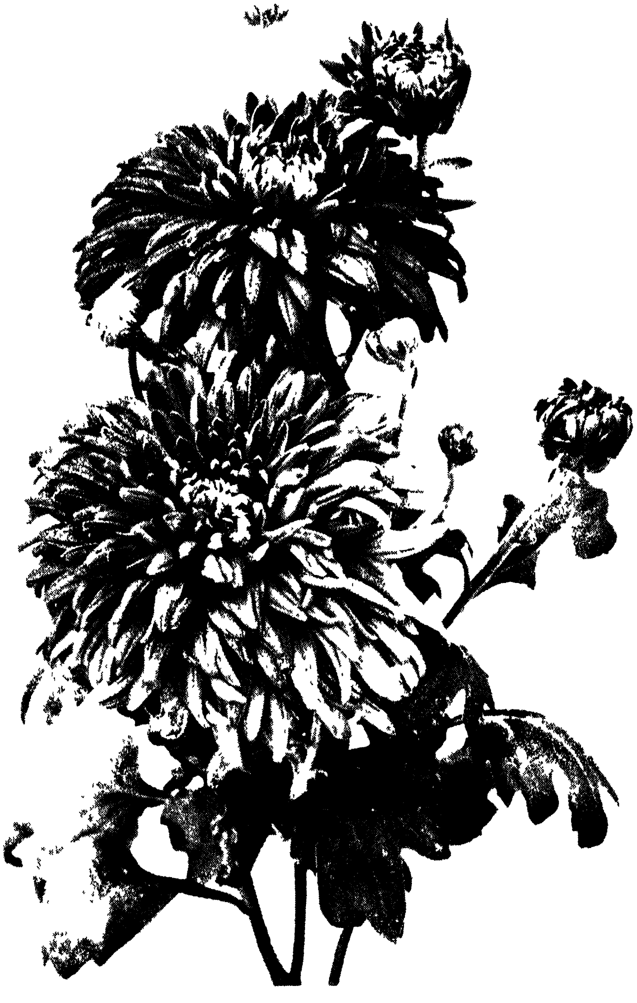

Fig. 10. Chrysanthemum 'Brilliance'

A.M. 1938 (p. 97)

Flowers bright rosy-crimson

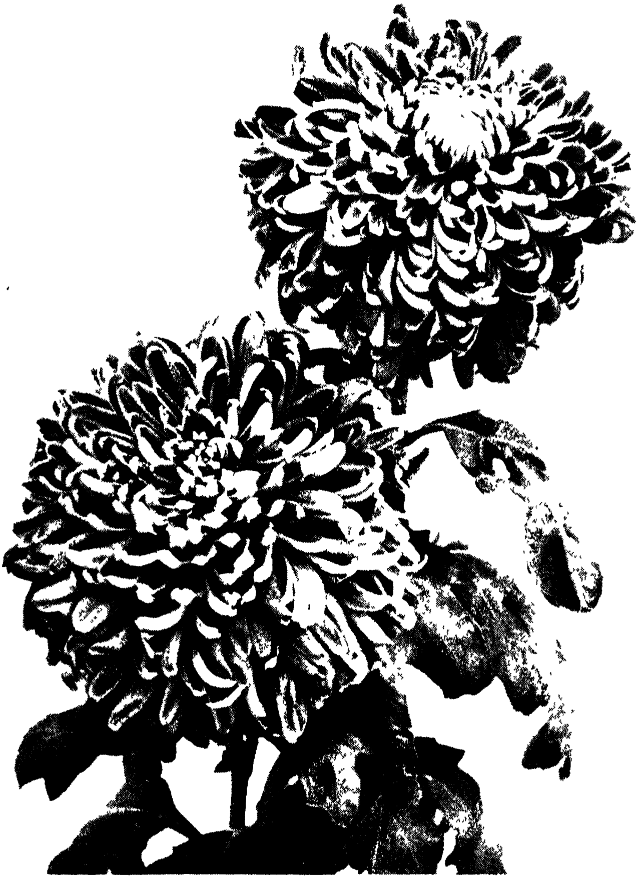

FIG. 11. CHRYSANTHEMUM 'CHALLENGER.'

A.M. 1938 (p. 97)

Flowers bright bronzy-crimson

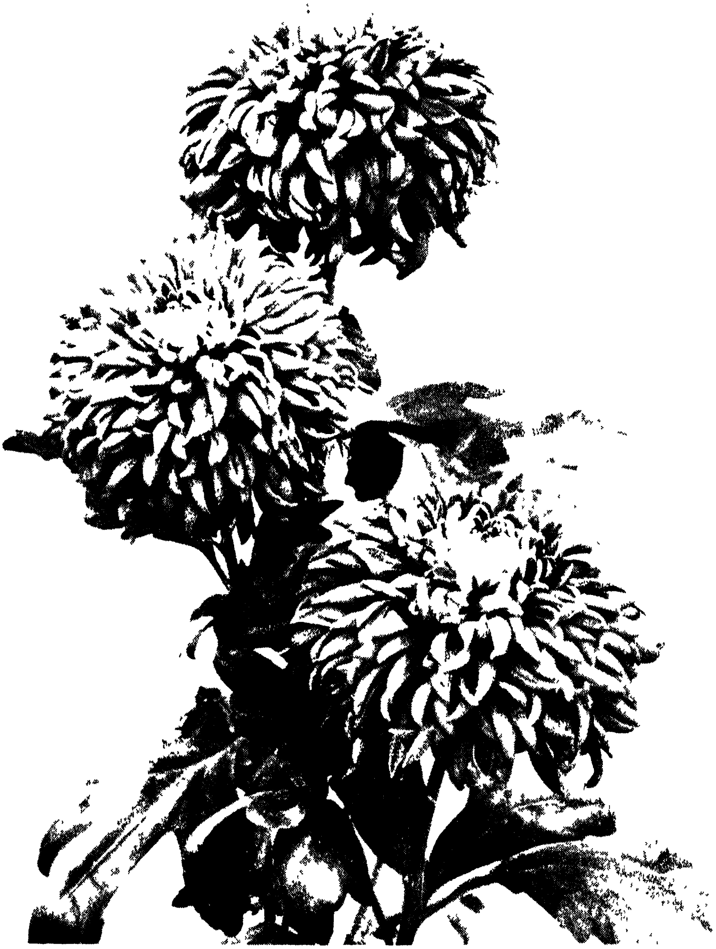

FIG. 12 CHRYSANTHEMUM 'ENDEAVOUR'
A.M. 1938 (p. 97)
Flowers light chestnut-crimson, old gold reverse

[To face p. 97

decoration.—2½ feet. Flower stems 18 to 24 inches long. Flowers 4½ inches diameter when disbudded, bright orange-red, with a golden reverse.

Rufus* (raised and sent by Mr. H Shoesmith). **A.M.** September 21, 1938, for garden decoration.—20 inches, of bushy habit. Flower stems 12 to 15 inches long. Flowers 4 inches when disbudded ; florets rolled, bright chestnut-red.

Royal Salute (sent by Messrs. R. H. Bath, Floral Farms, Wisbech, Cambs.). **H.C.** September 21, 1938, for garden decoration.– 2 feet, erect bushy habit. Flowers 4 inches diameter, in sprays, bright rich red, with a bronzy-red reverse.

The following varieties were grown in the trials and are retained for future judgment :

Bruce
Carnival* (Shoesmith)
Chestnut Precôce* (Stevenson)
Coppelia* (Johnson)
Cranford Red (Roots)
Cyril Coleman* (Johnson)
Daily Express* (Woolman)
Firecrest (Thorpe)
Giant Page* (Cole)
Jenny McAlpine (McAlpine)
Magnetic* (Riley)
Phoenix (Scott)
Reveiller* (Johnson)
September Red* (Cole)
Tiger* (Shoesmith)
Warrior (Shoesmith)
Welcome (Shoesmith)

Flowers of Crimson Shades.

Brilliance (raised and sent by Mr. A. W. Thorpe). **A.M.** September 12, 1938, for garden decoration.– 1½ feet, of compact, bushy habit. Flower stems 6 to 12 inches long. Flowers 4 inches, in spray form ; florets semi-rolled, bright rosy-crimson. (Fig. 10.)

Challenger* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 21, 1938, disbudded for cutting.– 2½ feet. Flower stems 18 inches long. Flowers 4 inches diameter when disbudded, bright bronzy-crimson, reverse reddish-bronze. (Fig. 11.)

Crimson Circle (raised and sent by Mr. A. W. Thorpe). **A.M.** September 21, 1938, as a spray and garden decoration variety.– 2¼ feet. Flower stems 12 to 18 inches diameter, in sprays, rich crimson.

Endeavour* (raised and introduced by Mr. C. T. Kipping and sent by Messrs. Torrance and Hopkins). **A.M.** September 21, 1938, for garden decoration.– 2 feet. Flower stems 18 inches long. Flowers 4½ to 5 inches diameter when disbudded, light chestnut-crimson with an old gold reverse. (Fig. 12.)

Indiana* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 21, 1938, for garden decoration.—2½ feet. Flower stems 18 to 24 inches long. Flowers 4½ inches diameter when disbudded, rich velvety crimson, reverse deep bronzy old gold.

Red Crusader* (raised and sent by Mr. H. Shoesmith). **A.M.** September 7, 1938, disbudded for cutting,– 2¾ feet. Flower stems 12 to 20 inches long. Flowers 4 inches diameter when disbudded, rich crimson, with a reddish-bronze reverse.

Signal* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 7, 1938, disbudded for cutting.—2¾ feet. Flower stems 12 to 20 inches long. Flowers 4 inches diameter when disbudded, rich crimson, with a reddish-bronze reverse.

Valiant* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 29, 1938, for garden decoration.—2½ feet, very free-flowering. Flower stems 18 to 22 inches long. Flowers 4 inches diameter when disbudded, deep chestnut-crimson self.

The following varieties were grown in the trials and are retained for future judgment:

- Alettra* (Thorpe)
- Arcadian (Shoesmith)
- Ardent* (Johnson)
- Beauchief* (Johnson)
- Clara Ward* (Ward)
- Conqueror* (Shoesmith)
- Crimson Glory* (Shoesmith)
- Crimson Page* (Godber)
- Etincellent* (Vinten)
- Jim Thorpe (Thorpe)
- Jim Tomlinson* (Woolman)
- Mayford Red* (Shoesmith)
- Mayford Red Sport*
- Mrs. Douglas Foxwell* (Foxwell)
- Red Invader* (Johnson)
- Red King* (Shoesmith)
- Red Queen* (sport from 'Salmon Queen')
- Red Rover (Shoesmith)
- Robin* (Thorpe)
- Topsy* (Johnson)
- Toreador* (Johnson)
- W M Woodful* (Woolman)
- Westbourne* (Johnson)

Flowers Mahogany-crimson.

The following variety was included in the trial and is retained for future judgment:

- R. G. Collicot* (Thorpe)

Flowers of Ruby-crimson Shades.

The following varieties were included in the trial and are retained for future judgment:

- Brilliancy (Bath)
- Clarion* (Riley)
- Crimson Zinnia (Thorpe)
- Darkness (Thorpe)
- Dick Barnes (Thorpe)
- Mayland Red* (Kipping)
- Wembley

Flowers of Purple Shades.

Velveteen* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 7, 1938, as a disbudded variety for cutting.—2 feet. Flower stems 12 to 15 inches long. Flowers 3½ inches diameter when disbudded, bright wine-purple.

Zenith* (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 7, 1938, as a disbudded variety for cutting.—2½ feet, of compact, bushy habit. Flower stems 12 to 18 inches long. Flowers 5 inches when disbudded, light rose-purple, with a rosy reverse.

The following varieties were included in the trial and are retained for future judgment:

- Lichfield Purple* (Thorpe)
- Purple King* (Johnson)
- Royal Purple* (J. J. Thorpe)
- Yo-Yo (A. W. Thorpe)

BOOK REVIEWS.

"Herbals, their Origin and Evolution." By Agnes Arber. Ed. 2. 8vo. (Cambridge University Press, 1938.) 21*s*. net.

All students of Herbals have long been indebted to the first edition of Mrs. Arber's valued book, and now a second and greatly revised edition has been published for our further enlightenment and pleasure.

The format is the same as before, but the extension of some seventy pages and the addition of five plates and eighteen text figures show that the new edition is no mere re-print. Many new facts of interest will be found by the careful reader, such as the discovery that the German *Das pûch der natur* is taken from a Latin original compiled in the thirteenth century by a pupil of Albertus. The recent discovery of Weiditz's original drawings, now available in reproduction, is described on p. 206 and is of the greatest interest as we can now compare those originals with the cuts made from them.

The story of Plantin's life and work is also told in greater detail as it merits. To book lovers, the famous house at Antwerp is one of the greatest relics of antiquity. An interesting addition is found in chapter IV where the Herbal in Spain and Portugal receive consideration, a subject on which there is little information in the English language. There is matter in this volume for many besides botanists, the evolution of the art of drawing from Nature will interest many and send all of us back to our Herbals with awakened interest, and as we take them once again from our shelves it is curious to reflect that their origin and object were medical.

How many aged eyes, seeking for a cure for some dying patient in the next room, have pored over the pages we now curiously turn! To how many careless students must their Herbals have been a daily drudgery, as little loved as Euclid by the schoolboy of to-day!

For us they are history in the making as we see new plants from some new-found world slowly taking the place of older remedies, often overpraised as new things will be.

And in their sober pages there comes now and again a flash of personality which endears their writers to us. And if we are tempted to smile here and there at the childlike acceptance of marvels, is our appetite for the incredible any less in these days?

Mrs. Arber has opened a door into the past for many of us, a past which still deserves a fuller exploration than it has yet received. The early history of our garden plants in Europe has yet to be fully written. If ever it is, the records of the Herbalists will play an important part and those who have wisely collected these books, despite their lack of "practical value," will then receive some credit for their foresight.

E. A. Bunyard.

"To Persia for Flowers." By Mrs. Alice Fullerton. 8vo. xvi + 195 pp. (Oxford University Press, 1938.) 10*s*. 6*d*.

This is an account of the journey to Persia of two ladies on a plant-hunting expedition. They decided to travel *via* Russia, as this appeared to be the cheapest route. Actually they found it to be the most expensive as, although they had paid in London what professed to be an inclusive charge, they were mulcted for extra fees by "Intourist" all the way to Baku. The book is well got up and well illustrated and the authoress writes attractively of their joint journey. They left England on March 1, much too early a date, and so had to spend some time in Teheran before starting their search for flowers. Eventually they moved to Sultanabad, between Kasvin and Hamadan, and camped out in a somewhat dilapidated mud house. The latter part of the book is an account of their life there and of the friendships they struck up with the villagers. The authoress appears to have been most successful as an amateur doctor, but some of the details of her cases might with advantage have been left out. The last ten pages, consisting of an Appendix entitled "The Flowers of Persia (for flowers lovers only)," contain practically the only information about the flora of Persia!

The book, however, would be of use to anyone following in their footsteps in showing what errors to avoid.

Col. Napier.

"The Cultivation of Mushrooms." By W. F Bewley and J. Harnett. Ed. 2. 8vo 95 pp (Anglo-Scottish Press, London, 1938.) 3s. *6d*

A second edition of this excellent little book has been called for and the opportunity has been taken to revise and enlarge it both as regards text and illustrations In particular, a full description of the shelf method of cultivation which has been developed in recent years is now given.

"Plant Growth Substances: their Chemistry and Applications, with Special Reference to Synthetics." By Hugh Nicol. 8vo. (Leonard Hill, London, 1938.) 3s. *6d.*

This book is based on articles which appeared in the Manufacturing Chemist, also published by Messrs. Leonard Hill The sub-title indicates that the author is primarily concerned with the active substances as chemicals which may be applied to plants in order to regulate their growth Thus the text contains much technical chemical matter including structural formulæ. His interest in the induced reactions shown by the living tissues of the plants appears to be secondary, for on p. 3 he states, "I have written nothing under that head (plant physiology) because I am not a plant physiologist and don't understand the subject sufficiently to discuss it in detail," but, he continues, "However, some hints as to how plants grow can be gained by observing the effect of different substances on plants."

There can be no doubt that to the horticulturist and also to other botanists, *the effects* of the growth substances when applied to cultivated plants are of major interest, for amongst these may be mentioned the production of roots from stems so that vegetative propagation can be facilitated These reactions attracted sufficient attention to permit, if not to create, the sale of bottled solutions of the highly active chemicals. The author does not discuss other possible practical uses such as the application of weak solutions of naphthalene acetic acid to induce the formation of fruits, and to retard the bud development in frost areas, thus saving a potential crop

Despite his disclaimer regarding their mode of operation, on pp. 35 and 36, there is a brief attempt to distinguish between phases of the response shown—between growth promotion and regulation—and again on p 93 he has written something on the physiological aspect when discussing various methods of testing chemicals for activity.

The author comments on the rapid increase in our knowledge of such substances, and remarks that one well-known standard work by Boysen Jensen (1936) contains very few references to the substances which he now lists. In view of this remark, it is surprising that on p. 11 one reads, "At present the chief and indeed only commercially available growth substances the horticulturist and amateur gardener need trouble about are indolyl acetic acid and phenyl acetic acid." This is far from true, for phenyl acetic acid has been known for at least three years to be so relatively ineffective as to be comparatively useless to the horticulturist Furthermore, commercial preparations (advertised in this very booklet), containing other highly active substances have been on the English market for eighteen months, and other useful American preparations have been available for a longer time But perhaps the author has not himself tested these solutions containing indolyl butyric acid, and naphthalene acetic. Later he partially contradicts this erroneous statement, for on p. 41 he quotes "three principal substances," according to valuable experimental evidence obtained at the Boyce Thompson Institute.

For the amateur there are special chapters written as hints to the layman. These are simple instructions regarding the use of growth substances for propagation

The quaint quotations selected as headings to certain chapters relieve the tedium of numerous chemical formulæ. The excellent illustrations show results obtained by other workers, but the legend for fig 1 facing p 40 (on which are the legends for figs. 2 and 3) may be found, after search, on p 10 The author is convinced that "the proper place for a preface is the end of a book." The references are also arranged in a somewhat novel manner, and might with advantage have been grouped together. A valuable feature of the book is the list, or tabular index, of active substances, which forms chapter 10. There is no other index to the subject-matter, and the index of plants, to be found on an unnumbered page amongst advertisements, shows how very few plants have been considered in the text in this respect.

M. A. H. TINCKER.

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Vol. LXIV

Part 3

March 1939

6-4-39

FORTHCOMING EVENTS.

COMPETITIVE CLASSES FOR AMATEURS.

Two or three years ago it was decided not to hold a special Amateur Show, but to substitute at the fortnightly shows competitive classes concerning certain plants.

The list of these competitive classes is given on the Fellows' tickets, and it will be noted in the " Forthcoming Events " that several of these competitions are taking place during the next two months.

The object of these competitive classes is to encourage amateurs, and in some instances professionals, to bring up their produce and enter into competition, thus giving an opportunity to the Fellows to see some of the best plants of our gardens.

There is a competition in March for Cymbidiums, and in April for rock-garden and alpine plants and for Odontoglossums.

CALENDAR.

On March 7 (12 noon to 7.30 P.M.) and 8 (10 A.M. to 5 P.M.) there will be a Fortnightly Show. Alpines are sure to be present in numbers, and Mr. D. E. HORTON will lecture in the Lecture Room of the New Hall at 3.30 P.M. on " Bulb Experiments " on March 7.

On March 8 at 3.30 P.M., in the Lecture Room of the New Hall, the informal talk on some Flowers in the Show will be given by Mr. F. G. PRESTON.

On March 8 and 9 (2 to 4 P.M.), at Wisley, there will be a Practical Demonstration (weather permitting) of Seed Sowing, Indoors and Outdoors.

On March 15 and 16 (2 to 4 P.M.) a second demonstration at Wisley will take place (weather permitting) on Rose Pruning and Spring Pruning of Shrubs.

Fellows who wish to attend these Demonstrations should inform the Director of the Gardens, Wisley, Ripley, Surrey, beforehand, so that all arrangements can be made for their comfort.

On March 21 (12 noon to 7.30 P.M.) and 22 (10 A.M. to 5 P.M.) there will be a Fortnightly Show. Forced flowering shrubs will probably be a feature, and at 3.30 P.M. in the Lecture Room on March 21, Mr. GUY L. WILSON will lecture on "Daffodil Gardening."

At the Fortnightly Show on March 21–22 there will be a competition for twelve Cymbidium plants (species and/or hybrids) staged by an amateur, a silver trophy being offered by the Orchid Trade to the most successful competitor. Entry forms may be had on application to the Secretary and must be returned not later than by the first post on Wednesday, March 15.

On March 22 at 3.30 P.M. the informal talk on some Flowers in the Show will be given by Mrs. GWENDOLINE ANLEY in the Lecture Room of the New Hall.

The Alpine Garden Society's Show will be held in the Old Hall on March 28 (1 to 7.30 P.M.) and 29 (10 A.M. to 5 P.M.), and the British Carnation Society will hold their show in the New Hall at the same times.

On April 4 (12 noon to 7.30 P.M.) and 5 (10 A.M. to 5 P.M.) there will be a Fortnightly Show, and on this occasion there will be a competition for the Sewell Medals for exhibits of plants suitable for the rock garden or alpine house. There will be a Gold Medal offered for an amateur's exhibit, and one for a horticultural trader's exhibit. The particulars of the competition will be found on page 31 of the January JOURNAL. These competitions are worthy of more entries than they have received in the past.

On April 4 at 3.30 P.M. there will be a lecture by the Viscountess BYNG OF VIMY on "Rock Plants I can grow."

On April 5 at 3.30 P.M. there will be a lecture, under the auspices of the Institute of Landscape Architects, on "Planting from Seed in Public Parks and Gardens," by Mr. R. E. HAY. Fellows of the Society will be welcomed.

On April 5 and 6 (2 to 4 P.M.) there will be a demonstration at Wisley (weather permitting) on the Spring-Spraying of Fruit Trees. Notice of intention to attend this demonstration should be sent to the Director of the Gardens at Wisley.

The Daffodil Show will be held in the New Hall on April 13 (1 to 7.30 P.M.) and 14 (10 A.M. to 5 P.M.). Entries close on April 10. There will also be a special exhibit from Wisley on the Pests and Diseases of Bulbs.

The Early Market Produce Show will be held in the Old Hall at the same time as the Daffodil Show. Entries close on April 6. Schedules for the above two shows are obtainable from the Secretary.

On April 13, at 3.30 P.M. in the Lecture Room, a lecture will be given by Mr. AMBROSE HEATH on "Salads and their Making." It is hoped that a practical demonstration will be arranged.

On April 14, at 3.30 P.M. in the Lecture Room, the informal talk on some Flowers in the Show will be given by Major C. B. HABERSHON.

On April 18 (12 noon to 7.30 P.M.) and 19 (10 A.M. to 5 P.M.) a Fortnightly Show will be held, and on this occasion a silver trophy, presented by the Orchid Trade, is offered for competition for an exhibit of twenty-five Odontoglossum plants (species and/or hybrids, including Odontiodas, etc.) staged by an amateur. Entry forms may be had on application to the Secretary, and must be returned not later than by the first post on Wednesday, April 12.

On April 18 (12 noon to 7.30 P.M.) the National Auricula and Primula Society will hold their show in conjunction with the Society's Fortnightly Show.

On April 18 at 4.30 P.M., in one of the annexes of the Old Hall, the Lily Group will meet to hold a discussion on the Propagation of Lilies.

On April 25 (1 to 7.30 P.M.) and 26 (10 A.M. to 5 P.M.) the Alpine Garden Society will hold their show in the Old Hall.

MASTERS MEMORIAL LECTURES.

The Masters Memorial Lectures for 1939 are to be given by Dr. J. C. WILLIS, F.R.S., on "How Plants have found their Homes." The lectures will be given on April 18 and 19, at 3.30 P.M. in the Lecture Room of the New Hall.

EXAMINATIONS.

On March 9 the Society's General Examination, and on March 18 the Examination in School and Cottage Gardening for Teachers, will take place throughout the country.

The Written Examination for the British Floral Art Diploma will be held on March 30, and the practical part of this Examination will follow on April 26 and 27.

The Written Examination for the National Diploma in Horticulture will take place on April 29.

SMALL EXHIBITS TABLE.

One of the many attractions at the Fortnightly Meetings is the table for small exhibits from Fellows. Most Fellows have from time to time some plant, flower, fruit or vegetable which, because it is uncommon or especially well grown, would be of interest to other Fellows, and the small Exhibits Table on the dais is specially provided for these exhibits. It is not necessary to apply beforehand for space, but if Fellows will bring their exhibits by 12 noon on the first day of a meeting, and hand them to the clerk in attendance, he will see to their staging and labelling. Exhibits staged under this arrangement should not consist of more than three pots, vases or dishes.

PUBLICATIONS.

Attention is again drawn to the five most popular publications of the Society :

ORNAMENTAL FLOWERING TREES AND SHRUBS, price to Fellows of the Society, 7*s*. 6*d*.

SOME GOOD GARDEN PLANTS, price 4*s*.

Both of these publications should be extremely useful now and throughout the year, especially for those visiting the Fortnightly Shows and Chelsea, so that they can look out and see the plants themselves and to confirm their opinions of the usefulness and the beauty of the plants described.

Then for the specialist there is the DAFFODIL YEAR BOOK for 1938, price 5*s*. paper, 6*s*. cloth. The Daffodil Show will be in April and this book will be a guide to all Daffodil lovers as to what to look out for.

Later on in the year the LILY YEAR BOOK for 1938, price 5*s*. paper, 6*s*. cloth, should serve the same purpose.

Another publication of the Society, which has had a very good reception and very good criticism from nurserymen and amateurs, is the HORTICULTURAL COLOUR CHART, brought out in conjunction with the British Colour Council. Fellows and Associates may still obtain the first volume at the subscription rate of 10*s*., plus 6*d*. postage inland and 1*s*. overseas. The Secretary would be very pleased to hear, from those who have purchased a copy, of any matching of colours with plants that they may have done in their garden.

The second volume of the chart is well in hand, and if unavoidable delays do not occur again, it should be published this year.

XIITH INTERNATIONAL HORTICULTURAL CONGRESS, BERLIN, 1938.

The organizers of the XIIth International Horticultural Congress desire to draw attention to the impending publication of the REPORT AND PROCEEDINGS OF THE CONGRESS which may be purchased by non-participants, if ordered at once. The Report and Proceedings will comprise two bound and illustrated volumes which will be sold to purchasers abroad at the exceptional price of 16 RM. including postage. The Congress management points out that it is necessary to order the books immediately to ensure delivery. This note does not concern the members of the Congress : these will receive the Report and Proceedings of the Congress free of charge and without further notice. In ordering the books please apply to : XIIth International Horticultural Congress, Berlin, W.35, Potsdamerstr. 101. Remittances may be sent to the Postscheck-Konto of the Deutsche Gartenbau-Kredit-A.-G., Berlin, N.W.40.

HALL LETTINGS.

The Halls have been let as follows:

From March 6 to 11 for the Annual Badminton Tournament. Particulars obtainable from C. Marriott, Esq., c/o The Badminton Association of England, 20 Telford Avenue, Streatham Hill, S.W. 2.

The National Rose Society will hold their show on April 21. Particulars obtainable from the Secretary, National Rose Society, 117 Victoria Street, S.W. 1. The Fellows' and Associates' R.H.S. tickets do not admit to this show.

WISLEY IN MARCH.

On the west wall of the Laboratory a striking feature is the old tree of *Acacia dealbata* by the door, with its myriads of fluffy yellow balls, whilst under the south wall the Algerian *Iris unguicularis* continues to produce its mauve flowers which have been appearing since early January.

Within the first or Half-hardy house some interesting plants are the prostrate form of *Acacia diffusa* from Tasmania, mauve-flowered *Prostanthera Sieberi*, *Corydalis thalictrifolia*, and the almost ever-blooming *Cassia stipulacea*, a native of Chile. In the adjoining house are Cinerarias and Calceolarias together with a variety of Schizanthus on trial; in the large Temperate house a greater selection of tender shrubs comes into flower at this season, including species of Acacia and Rhododendron, especially *Rhododendron ciliicalyx* and *R. Oldhamii* with brick-red flowers and creeping habit, *Loropetalum chinense*, which is closely related to Hamamelis but has paler blossoms and is much less hardy, *Pomaderris elliptica*, the rich golden *Fremontia mexicana*, and of climbers *Bignonia capreolata* and the dull red, pea-flowered *Kennedya rubicunda*.

By the path leading to Seven Acres, under the old Apple trees, the collection of Dutch Crocuses forms a glowing mass of colour in sunshine, succeeded by the Polyanthuses amongst which they grow. In Seven Acres itself the yellow of the Forsythias is conspicuous at a distance, like the clumps of Daffodils amongst the shrubs, the different forms of the Myrobalan Plum, such as *Prunus cerasifera nigra*, the Almonds, *Prunus yedoensis* which produces such a quantity of pale pink blossoms, and *Spiraea Thunbergii*, but for the silver or pale yellow catkins of the Willows on the side of the pond and the rosy or vermilion cups of the Japanese Quinces one has to walk closer and seek more carefully. In the Heath Garden there is much colour from the different forms of *Erica carnea*, especially the late, dark crimson *Vivellii*, *E.* × *darleyensis*, and the taller *E. mediterranea*, of which the variety *superba* is the tallest and most handsome. *E. australis* from Spain and Portugal is also likely to be in flower before the end of the month, the rose-flowered type being preceded by its white variety, 'Mr. Robert.'

Some notable plants in the Award of Merit Garden, which lies between the Azalea and Wild Gardens, are the fine specimen of the hybrid *Magnolia Soulangiana* covered with upright pinkish cups, the yellow Cornelian Cherry, *Cornus Mas*, the large old trees of *Prunus cerasifera Pissartii* at either end, and at one side the even more delicately attractive *P. subhirtella*, a native of Japan, conspicuous for the masses of soft pink blossoms with which the tree is decked. *Osmanthus Delavayi* is an excellent evergreen shrub with Box-like leaves and a profusion of fragrant little white flowers.

The forms of *Camellia japonica* in the Wild Garden are at their best this month, not only the old bushes towards the western end but also the younger examples planted in the central clearing a few years ago, and with their great variety in shape and colour of flowers are worthy of close attention. Another evergreen shrub of quality represented by old specimens is *Pieris japonica*, with tassels of white bells which are unaffected by severe weather, in distinction from those yellow ones of the Corylopsis tribe which look so pretty on the bare branches but are easily damaged by frost. Smaller plants which brighten up the woodland in March are *Narcissus cyclamineus* of rich gold, *Primula denticulata* in royal purple (especially profuse on the side of the ditch between Seven Acres and the Wild Garden), the evergreen *Shortia galacifolia*, and *Erythronium revolutum* from western N. America. *Rhododendron Fargesii* and *R. Thomsonii* with blood-red bells are forerunners of that huge race of which the bulk come into bloom later, but some of the smaller members will be seen on the Rock Garden, including *R. leucaspis* with clear white open saucers, and the profuse pink *R. racemosum*. About the middle of the month the Alpine Meadow is starred with hundreds of the Hoop Petticoat Daffodil, *Narcissus Bulbocodium*, one of the prettiest sights of the spring at Wisley. Many other plants will also be found here, of which only a few can be mentioned. *Daphne Blagayana* in a shady corner has every shoot terminating in a cluster of scented creamy-white flowers ; *Pulmonaria angustifolia* forms a patch of bright blue, as do the Chionodoxas beside the path by the pond. The Pasque Flower, *Pulsatilla vulgaris*, opens now with its several varieties, and so do a number of Primula species and hybrids, together with *Narcissus nanus* and *Saxifraga oppositifolia*, of which there is a large patch on the scree. In the Alpine house Saxifrages form the majority of the plants in flower, but Primulas, *Lithospermum oleoides*, *Polygala Vayredae*, Androsaces, *Shortia uniflora grandiflora*, and *Armeria caespitosa* are some of the other attractive and suitable plants growing there.

MASTERS MEMORIAL LECTURES, 1938.

THE BEHAVIOUR OF PLANTS.—II.

By F. J. CHITTENDEN, F.L.S., V.M.H.

[Read November 8, 1938; The Lord ABERCONWAY, President, in the Chair.]

IN the first of these Masters Lectures on the behaviour of plants I dealt mainly with scientifically proved facts concerning the hidden but essential developments which go on inside buds when we may well imagine everything is at a standstill.

Most of the matters upon which I shall be able to touch this afternoon have been matters of observation rather than of definite experiment, and any conclusions we may come to are more in the nature of working hypotheses rather than what we often call laws of Nature.

There is no more frequent question asked concerning a plant than whether it is hardy or not. "Hardy" applied to a plant means, I suppose, able throughout its life without special protection to survive the various changes of weather that constitute our climate, especially our winter climate. We usually have to qualify the statement to some extent by saying "in the neighbourhood of London," for there are few areas in the British Isles with a less favourable winter climate for plants, and many with a better.

Is there any way of ascertaining, save by trial, whether a plant will prove hardy or not?

We might assume, knowing no better, that a plant subject to more severe conditions in its native home than it would be likely to experience here would certainly prove hardy. And we might call to our aid those modern instruments of precision, recording thermometers, barometers, rain-gauges, photometers, sunshine recorders, and so on, and prove that its new environment must be more congenial than its old. More genial it may be, but more congenial remains to be proved, for we should have overlooked, not only the different responses to the same conditions of temperature now known to be exhibited by similar types of plants to which I drew particular attention in my first lecture, but also the unpredictable degree to which a plant is able to adapt itself to new conditions.

This power must in some plants be enormous. What a remarkable instance the Maidenhair Tree provides. The fossil remains of the foliage of *Ginkgo biloba* are found as far back in geological time as the earliest of the flowering plants of which it is the sole survivor. So far as can be seen, the form and structure of its leaves, and presumably the rest of it, have come down unchanged through all those ages, through all the multitudinous upheavals the world has seen since that remote period, yet it still survives, although perhaps nowhere now in a wild state. Doubtless most of the changes occurred slowly and gave time for the tree to spread to other areas, but this survival must indicate tremendous powers of adaptation.

Look for a few moments at the other side of the picture.

I read this the other day: "We came upon a glorious display of *Primula nivalis* growing in thousands on ledges watered by the melting snow. There can be little or no earth in such a situation, and there is no doubt that this is the hardiest of all Primulas, rejoicing as it does in barren rocks, running water and coarse grit." Perhaps you can picture the scene so described by Mr. SMYTHE in the "Valley of Flowers." There are the plants high up in the vast Himalaya—the sun shining bright upon them in the clear air, the keen wind blowing over them, the sound of running water in your ears, and the glorious sight of perhaps the most noble race of Primulas in thousands before you. But hardy, no—not in the sense of hardiness as understood by the gardener. It lacks the power of adapting itself to new conditions.

It is possible that Mr. SMYTHE was mistaken in his identification, for *P. nivalis* is a native of Siberia, but it has near relatives, many of which have at some time or other been called *P. nivalis*, in all the high lands from the Caucasus eastwards and northwards to north-west America. Over sixty close allies of *P. nivalis* have been described, and nearly all have failed in cultivation. *P. nivalis* itself was introduced in 1790, nearly 150 years ago. It is a beautiful plant, as indeed are nearly all of its section. Large quantities of seed of one or other of its allies have reached this country from every collector in the Himalaya, China and Tibet, yet scarcely any have proved amenable to cultivation. *P. Maximowiczii*, it is true, is fairly easy, but it is one of the least desirable. *P. chionantha* is fortunately established in cultivation and is well worthy of the little care it needs, but *P. chionantha* is not a plant of the barren rocks; it forms part of the alpine meadow flora, where GEORGE FORREST collected it on the Chungtien Plateau at an elevation of 12,000 to 13,000 feet. Moist, rich, well-drained soil suits it. The late Sir ISAAC BAYLEY BALFOUR told me he had succeeded with a few other Nivalis Primulas in soil suited for roses in the Royal Botanic Garden, Edinburgh.

One other instance I may take. There are in New Zealand, a country with a climate in many ways similar to our own, a considerable number of species of shrubby plants closely related to the Asters, known as Olearias. Many have been introduced to this country, but only one, *Olearia Haastii*, is generally hardy. Strangely enough, *O. Haastii* is by no means a common plant in New Zealand, but it has proved itself very adaptable here.

These are but examples, and I feel justified in making my first generalization. Close botanical relationship between plants is no guide regarding their amenability in cultivation, nor is it any reason to neglect trial of a new plant because its close relations have proved recalcitrant.

Just as one approaches the top of the bank on which the rock garden at Wisley is made there is a bush of *Choisya ternata*. It was of good size when I first went to Wisley more than thirty years ago, and it is still there. The only difference is that it is larger now than then, and in the meanwhile it has withstood several severe winters, even with temperatures 4° below zero. There can thus be no question of its hardiness. Yet it is a native of Mexico, and it is the only Mexican shrub that is hardy in this country. Yet there is no obvious character which distinguishes *Choisya ternata* from other Mexican evergreens.

The beautiful *Eucryphia pinnatifolia* is much hardier in this country than *E. cordifolia*: yet I am told that *E. cordifolia* in its Andean home lives at a higher elevation exposed to far worse climatic conditions than *E. pinnatifolia*.

Just as with the Olearias, the many New Zealand species of shrubby Veronicas have provided few species really hardy here, but there are a few like *Veronica Traversii* which can be safely grown in most parts of England.

This leads me to a second generalization, viz. that the fact that one plant from a certain area has proved hardy is no guarantee that others from the same area will be equally amenable, nor is the tenderness of some plants from an area to be regarded as putting their natural companions out of the chance of making their homes in England.

The failure of *Primula nivalis* is after all not really a question of hardiness in the sense of failure to withstand low temperatures. All the Primulas of its group make large, rather tight resting buds and a number of thickish cord-like roots. Their failure nearly always takes the form of rotting at the "collar." They behave as though they resented a wet neck, and there are many plants like them. It may, however, be that the cause of their undoing is the fluctuations in temperature to which the winter in our climate exposes them.

On their native heights these winter buds are buried deep under snow as a rule. They are dry, the temperature is fairly constant and low enough to ensure practically complete rest, and they are not subject to any loss of water from the time the snow cover comes till they are free again. There is doubtless a time before or after when the temperature and other conditions are right for the maturation of their foliage leaves and flowers in the bud, such as we have seen is necessary for Daffodils and Apples. To provide conditions even approximating these in our climate would be difficult, even if we knew exactly what each species required.

In spring the snow melts and water is everywhere. I cannot believe that the buds as they then begin to develop escape wet round their necks. But that water is never still. It is constantly running, and in consequence it is richly charged with dissolved air. I feel sure if we could supply our plants with pure water, constantly replaced, and containing much dissolved air, the amount of damping-off or collar-rot would be very greatly reduced, and a good many high alpines might succeed where now they fail. Probably much of the virtue of the scree lies here, but even the best scree cannot yet provide all I have postulated, and I may not have postulated enough.

I am convinced that many cultivators pay far too little attention to the supply of air to the roots of plants generally. Many of the cultural methods which have come down to us from antiquity have the effect of maintaining a supply of fresh air to the soil, but these methods are not always followed, and not a few of the ills which fall upon plants are traceable to neglect of soil aeration.

I do not mean it to be understood from what I have said concerning *Primula nivalis* that I think our chief preoccupation with a plant new to cultivation should be to provide it with precisely the same conditions as those surrounding it in Nature.

There is one factor in the environment of wild plants which is not active in our gardens, viz. competition. I need only refer to the wide variety of soils and climates in which the Wheat plant grows in cultivation: yet as soon as the isolation it is given there is removed and it has to enter into competition with others it goes under.

There are instances innumerable to show us that plants are found in Nature often where they are driven to grow and would far rather grow elsewhere if they could. The Sea Poppy, *Glaucium luteum*, grows in England where few other plants can grow, on the sandy seashore. Yet in our gardens it demands nothing like this: it grows far better in our loamy soils than one ever sees it on the seashore. Competition has driven it there, not the necessities of its adaptations. Remove competition and it comes into its own.

The behaviour of plants in the wild sometimes illustrates the same thing. There are two species of Achillea in Middle Europe, as NÄGELI has pointed out, very closely related and apparently similar in their demands; they are *Achillea atrata* and *A. moschata*. In the Upper Engadine *A. moschata* grows on the slate rocks, and where these give place to limestone *A. atrata* takes its place completely—they do not intermingle at all. In other places only *A. atrata* or only *A. moschata* occurs, and when this happens both slate rocks and limestone rocks are equally tenanted with the one or the other. Both are indifferent to the presence of lime but neither is indifferent to competition with the other.

The alpine floras are rich in instances of the great variety of species found on the limestone hills compared with the number of species found on slate or siliceous soils. But experience in the field shows many an instance of plants which in one locality behave as limestone plants and in another grow freely on sandstone, and we are driven to conclude that competition, not preference, is the determining factor in their behaviour. The vast majority of the "limestone lovers," as many of these have come to be called, can be grown without difficulty in sandy soils without limestone, and those that fail, fail for some reason other than absence of that material. Indeed one is forced to the conclusion that "lime-loving" is a false conception, the real truth being that plants are either lime-hating or lime-tolerating.

All plants, of course, require calcium, the essential element of lime, but no soil is so deficient in it that it cannot supply sufficient for all the plant requires.

The value of lime in the soil in moderation is undoubted. Lime—and I use the word meaning carbonate of lime—counteracts soil acidity, and that for many plants is essential. Lime has an excellent effect in ameliorating clay soils. Lime helps to set free other materials in the soil for the use of plants. Excess of lime is poisonous to many plants: it interferes with the entrance into circulation of iron in the plant and the production of chlorophyll, so that the foliage becomes yellowish. One sees this in Rhododendrons frequently, in Laurels, in Plums, and in many other plants, but the amount of lime which can be called excessive varies in different soils and for different plants. As we all know, even minute quantities are poisonous to many species of Rhododendron and to many species of Erica, although both genera contain tolerant species—for example, *Rhododendron hirsutum* and *Erica carnea*, both, by the way, able to grow thoroughly well on soils suiting other species of Rhododendron and Erica; in other words, neither demands lime.

The choice of plants to cultivate on calcareous soils—a choice that has often to be made—resolves itself then into the avoidance of plants intolerant of lime; and for the rest to reduce the chance of the lime acting as a poison by adding quantities of decaying vegetable matter to it.

It is evident that the nature of the soil in which plants are found wild is no more a certain guide to their requirements in cultivation than is their relationship or country of origin a certain guide to their hardiness. At most it indicates what the plant will put up with, not what suits it best.

I drew attention in the first lecture to the changes that are going on in the bud of, for instance, the Apple during the winter, and to the resistance to damage shown by such a bud being much more marked at one stage than another. Hardiness indeed almost always involves the idea of a plant being at a certain stage of growth when exposed to low temperatures, and many a plant succumbs to frost because it becomes active at an unfortunate time. I am thinking of hardiness only as regards our own country, where very rarely is the soil frozen over long periods while the persistent foliage is exposed to dry winds and bright sun. In circumstances such as these broad-leaved evergreens stand but little chance, and many of them die, not because the temperature is low, but because they are losing water more rapidly than it can be replaced. The plants I have in mind are those like *Amaryllis Belladonna*, which produces its leaves in January or a little earlier, and there are many bulbous plants like it. Without some special precautions they stand little chance of thriving, for the almost inevitable destruction of their foliage leads to starvation. Certain shrubs and trees too start into growth in early spring, and this tender growth is killed or checked, though the older wood and, in evergreens, the older leaves may be undamaged.

These two groups of plants come either from the Southern Hemisphere or from areas where the winter is past when spring begins, and there is no fear of late frosts coming to work havoc as they are apt to do in many parts of England.

We have thus the two types of plants in regard to tenderness: those that at no time can stand frosts of more than a degree or two, and those that at certain stages of their life are tender.

Are these characteristics innate, or are they susceptible to change? In other words, is there any hope that a plant showing characteristics of tenderness when first introduced will become hardy after several generations in this climate?

We have plenty of illustrations of continued tenderness after long cultivation of what can be regarded as the same individual grown over many years, and also of many generations following one another annually. We may choose a few examples from among plants perfectly suited to reach their full development in our summer climate. The Potato was introduced somewhere about the beginning of the seventeenth century and is mostly grown from tubers—that is to say, the same individual (we call it a variety) is able to be grown, and is grown, over long periods of years. Some are still in cultivation which are a hundred years old, but their foliage is still killed by the first frosts, nor are there any varieties that have been raised from seed any more hardy. The Dahlia, which has been in England for a hundred and fifty years, is now no more hardy than when it first came. The Scarlet Runner, *Phaseolus multiflorus*, still suffers from the first frost, though its roots are not so easily damaged (just as with the Dahlia), but its near relative *P. vulgaris*, the French Bean, has long had a reputation for being a little more hardy, and this characteristic, after 300 years or so, it retains. For at least 350 years the Vegetable Marrow has been grown here, but it still stands no frost, nor does the common Nasturtium, introduced from Peru in 1686, of which some 250 generations have been grown here. Instances of such can be multiplied with ease.

An example of another type we see in the beautiful *Cercidiphyllum japonicum*, which always starts growth early only to have its young leaves crippled, and after more than fifty years here has not attained, in consequence, more than the size of a shrub, but which is so hardy that, for instance, in Ottawa, where severe and prolonged winters are the rule, it is a fine and lovely tree.

Doubtless this behaviour is the result of habits formed in ages past, and it is a perpetual source of hope that such habits may some day be broken, but we have little evidence that they can be broken, at least permanently.

Perhaps the greatest change to which we can subject a plant is to transport it to the Antipodes where the seasons are exactly opposite to ours. Plants can adjust themselves to the change, and some interesting facts have been recorded in the Daffodil Year Book regarding Daffodil acclimatization as it is called. The time for Daffodil-flowering in Australia is August and September, with a few in October. Our

Daffodils are lifted some time in June, and at the best the bulbs cannot reach Australia before mid-August. If they are planted then they will grow and possibly produce flowers at an unnatural time, for their normal temperature relations will be upset, and it takes, we are told, up to five years or even more for them to settle down and behave normally for the country. We need not be greatly surprised at this, for growers hold the view here that it may take as long as five or six years for bulbs moved from one side of the country to the other to produce the best results of which they are capable, and I have already, in the first lecture, hazarded the opinion that this may be because they have to get rid of all the old tissues formed in their former home before they are thoroughly in tune with the new. Here of course the change is far less, and there must be, if our own growers' ideas have any ground—and I think they have—the added disturbance of the change of season. If attempts are made to hold them over until the next planting season at ordinary temperatures, that is, until January, they suffer greatly, as they do in this country if kept out of the ground so long; but it has been found that if the bulbs are sent over as soon after lifting and drying as possible and put into cold store, much better results are obtained.

We have seen the same kind of thing with Freesias flowered at their normal time at the Cape, dried off and immediately sent over here to arrive about December. Potted up, as they must be, they grow and flower about May, long after those grown from corms produced in England. But let them grow again: they start long before January, beginning their growth in autumn as they did in their own native land, but in an autumn six months in advance of what it would be there. Their adjustment is not complete, but it is done mainly, even in this short time.

We have seen the same kind of thing too with Rhubarb. Long since Rhubarb had been taken to Australia and grown there. After many years some was sent back, and instead of producing its leaves in March they were produced in October, and it was assumed, perhaps naturally, that the Australian habitat had so altered the behaviour of this Rhubarb that it would now give a crop at the opposite season to the normal, and it was offered as such. It reverted, however, to the same season as usual in England, although the adjustment was more gradual than with the Freesias just referred to.

Not only are the actual plants which have become used to start at a certain time induced to change that time by the change from the Southern to the Northern Hemisphere or vice versa, but the seed germination follows the same behaviour, and only by radically altering the natural environment can we induce a partial change of behaviour. There is little doubt that not only temperature and amount of water supply play their part, but that length of day has a profound effect upon their behaviour too.

We must, I think, conclude that we cannot hope to change the constitution of a plant, nor its behaviour in regard to hardiness, in a reasonable time by any methods now known to us. Is there, then, no hope that a species of plant at first shown to be liable to death or severe damage by frost may yet prove hardy? There fortunately is for some things, and it is to be sought in two directions.

The first applies only to woody plants, and is an application of our treatment of half-hardy annuals and of the hardening-off process as it is called.

Plants in their first flush of growth are much more liable to frost injury than when their tissues are mature. It is only after some months of growth that the tissues of a young shrub or tree become thoroughly hardened and protected from loss of water by a corky bark. Furthermore, the incidence of frost is usually greater the nearer the surface of the soil. If, then, a woody perennial which is known to be near the border line of tolerance of frost is grown under protection until (1) it is sufficiently tall to lift its youngest parts above the frost line (which varies in different places), and (2) its lower part is thoroughly hardened and protected by the cork layer, there is good hope of its surviving.

The second measure is even more hopeful. We cannot define a species, but we can be almost sure that every group of wild plants to which the botanists deem it desirable to give a specific name contains individuals varying in many directions, and it often happens that one of these directions is in the degree of tolerance of low temperatures. This has frequently been tested in Nature, and only the most tolerant individuals are likely to have survived at the extremes of its range. It is likely that these tolerant individuals will hand on their tolerance to at least a part of their offspring, and it is therefore always well to procure seed from these plants. Some of those in the centre of its distribution may of course possess the same tolerance and the same power of transmitting it, but with these it will not have been tested. Close observation will often show degrees of tolerance in a batch of seedlings even from one source.

There is one other thing—and here I am perhaps on less certain ground, though there is experimental evidence to support it, and observations to lend colour to the view. It is that the conditions surrounding the formation of the seed, quite apart from what are called Mendelian heritable characters, and the treatment to which the seed is subsequently subjected, have an influence on the behaviour of the resulting plant. This is only another way of stating what I have already said regarding the behaviour of bulbs according to their place of origin, and it is the basis of what is called "vernalization." If the view be true then, there is a probability that the behaviour of plants raised from home-grown seed will differ from that of plants raised from seeds produced in their native home, perhaps separated from our gardens by half the world; and this difference may, and at times it apparently does, produce results which better fit the seedlings for their new home. At any rate there is the suggestion that wherever possible home-saved seed should be raised.

It is often interesting to watch the development and follow the behaviour of a newly introduced species through a few generations. One often sees occurrences that suggest, though they may not actually prove, that a change of habitat brings about variations that are handed on to succeeding generations. These occurrences serve both as an encouragement to persevere with a plant that does not at first sight appear to possess all the characters we desire, and a warning not to mark with high approval a plant that at first sight seems to be free from fault.

In 1906 GEORGE FORREST collected seed of a weed very common in the rice-fields about Tali in Western China, and it was sent home and germinated well. It was *Primula malacoides*. It had never been in cultivation in this country before, and had no very near relations in cultivation and certainly none in common cultivation. Furthermore, no marked variations had been recorded among the wild plants, nor so far as I can find have they been recorded since, and there was in the first plants raised little variation to be seen. The plants seeded freely and, as the plant was easily grown, flowered freely and was of a pleasant colour, it soon spread over the country. Soon one began to hear of variations in shade and size of flower, and later in doubling. Now every year brings new varieties in considerable numbers, and several of these varieties have proved so good as to warrant an Award of Merit. There is no suggestion that crossing with any other species has either been attempted or occurred. Has this variation been brought about by the changed environment in which the plant is now growing, or is it that the close observation which can be given has enabled these variations to be picked out and preserved, variations which in their native rice-fields would have been swamped? I am less inclined to think the latter is the explanation because of the behaviour of another Primula introduced over sixty years ago, *P. obconica*. Not many years ago a great student of Primulas remarked upon the fact that the Chinese gardeners had chosen *P. sinensis* for cultivation because of its great range of variation and rejected *P. obconica* on account of its lack of variety. At that time his comment seemed justified, for in spite of many years of cultivation in this country variations were few; yet since then many have occurred in colour, size and form of flower, as though it had taken many generations in the new environment to bring about a disturbance resulting in variation. I need not point out that these variations are not "beneficial variations" so far as the plants are concerned: they have no significance in the life of these plants; but they are significant so far as horticulture is concerned.

Here again, though, we cannot generalize. Change of environment does not always result in the production of variation. For two thousand years at least Seakale has been cultivated, but only two varieties, differing only in coloration, have been recorded. We are driven again to the recognition of the fact that the behaviour of a plant is determined by its intrinsic nature, and that each plant has its own limited power of adapting itself to new conditions, the limits in some instances being wide, and even very wide, in others very narrow, and we cannot tell by inspection which plants have the wide and which the narrow. Every plant must be the subject of experiment, and it is this perhaps which helps to make the transplanting of new plants from their native homes to the most hospitable country in the world for aliens such an interesting task. And there is too the hope that they, no matter from what climate they come, will be able to behave so well that they may make themselves at home and play their part in adding to the beauty of our English gardens.

VIOLAS AND PANSIES.*

By D. B. CRANE, F.R.H.S.

[Read July 19, 1938, by the Chairman, Mr. G. W. LEAK, V.M.H.]

WHEN I was asked to give a lecture on Violas and Pansies I readily acquiesced, but wondered what I could say after so much has been written regarding the beauty and usefulness of these two plants for the outdoor garden.

There is no plant of the hardy flower garden more popular. Under normal climatic conditions the plants come into flower in April or earlier; they continue to blossom throughout the summer and seldom finish their display until October.

Much as I admire the beauty of many hybrids of the *gracilis* type of the Viola, I do not propose at this time to consider them, but to confine my attention to the ordinary garden Viola and to refer briefly to the fancy and other Pansies which still continue to fascinate so many.

My concern for years has been to popularize the so-called Bedding Violas. The world is not nearly so well off for this type of plant as it was forty to fifty years ago. In latter years market-growers have taken a keen interest in the Viola; they find a ready sale, at quite remunerative prices, for the plants as they send them to market. Unfortunately, these growers confine their attention almost entirely to varieties that produce large blooms such as are grown in the North and Midlands for exhibition. The lists of the raisers are carefully scrutinized, and from them market-growers select the most promising varieties for their own purposes; and, after giving them a good trial in their own gardens, determine whether the new sorts meet their requirements. Should any of the varieties selected be good enough, they are grown in immense quantities, and are sent to market in shallow boxes—twenty-four plants in each box—with one large bloom on each plant, looking most attractive. Such plants will never look better than when they are distributed, as they have been grown to perfection and are sturdy and short-jointed. In a little while after planting in ordinary beds and borders the true habit of the plants is revealed. They become ungainly in their habit of growth and may have to be supported with short twiggy stakes. The flowers invariably get smaller as time passes. As a rule, too, their constitution deteriorates—especially in the South of England—and their value in the garden is lessened in consequence. There are, of course, exceptions;

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* Mr. D. B. CRANE had prepared this lecture for delivery on July 19, 1938, and had sent the MS. to Vincent Square, but, to the Society's loss, he became ill and passed away a day or two before the meeting. The lecture was kindly read by the Chairman of the meeting.

but, generally speaking, for garden purposes these large-flowered exhibition varieties are of little value.

I have made fruitless endeavours to get some of these market-growers to grow the smaller free-flowering sorts; but they will not have them, as they say these sorts have not large enough individual blooms to attract buyers. But I had one success with a light yellow variety which I named 'Linggii,' which unusual name has been corrupted into 'Lily' and it is now generally known on the market as such. It is free-flowering and of large size; it possesses a good habit and sound constitution, and comes into flower very early in the season. I wish there were more varieties of the same character.

Recently I visited the beautiful gardens at Trent Park, Herts, where I saw one of the finest displays of Violas I have ever seen. Mr. JAMES WILSON, formerly of the R.H.S. Gardens, Wisley, the capable head gardener at Trent Park, has demonstrated what a Viola garden should look like. He has Violas planted in two long beds with a wide grass path between them. The beds of Violas are arranged under two lines of bush apples which serve the purpose of providing partial shade from the sun during the hot weather. These beds of Violas are 100 yards in length and vary from 4 to 6 feet in width. The Violas are planted in imposing blocks from 5 to 7 feet in length, and each block contains from 300 to 400 plants. I have never before seen anything like it, and it is worth the journey to Trent Park to see it. The plants are given generous cultivation.

When viewed from either end of this long border the display presents a picture that is difficult to describe. What surprised me more than anything else was that comparatively coarse-growing plants, when grown in a mass as is the practice at Trent Park, appeared to lose their coarseness and seemed to be of quite ordinary growth. Doubtless in less space and in smaller quantity, the coarseness of growth would be more obvious and accentuated.

Planting is done in March in borders that have been well and carefully prepared. These same borders have been planted with Violas for many years, which proves most conclusively that much more than ordinary care has been taken in their preparation and their maintenance in a clean and healthy condition.

Here are the names of the varieties grown: *Yellows*: 'Royal Sovereign' (of medium size), 'Moseley Perfection' (large), 'Harry Merrifield' (very large), 'Linggii' (pale yellow); *Mauves*: 'Bridal Morn,' 'Elsie,' 'Newton Mauve'—this last one of the most attractive rayless mauve varieties and grown in immense quantities at Trent Park; *Whites*: represented by 'Lady Tennyson' and 'Swan,' which latter variety is inclined to sport, sometimes producing blossoms with a blue margin.

At present the best reddish-purple variety is 'Admiration,' an old Viola but still very useful.

'Pickering Blue' is the nearest approach to a pale blue variety, and this was flowering in profusion, though the growth is rather lanky.

Violas are also used at Trent Park as a groundwork for other plants, and in one very pretty garden 'Newton Mauve' was very effective.

Much as I admire and appreciate Violas in masses as displayed at Trent Park, my sympathy and interest are chiefly centred in the growing of these plants in smaller gardens of which there are so many. There are numerous comparatively small gardens in and around the cities and towns of this country, where it is not possible to plant things requiring much room but where the Viola and other free-flowering dwarf plants seldom fail to give a good account of themselves. Violas are often used as edgings to borders, and in such a position they invariably do well. They give more satisfaction, however, when planted in small groups in the border, the groups consisting of three, six, nine or a dozen plants, more or less, in each. They are then a source of interest for several months, provided they are given attention when they require it.

When planted in beds by themselves or as groundwork to beds planted with standard and bush roses they are invaluable, as they can be arranged to contrast pleasingly with the colours of the roses. I know of one garden where twenty-four beds of bush roses were planted with Violas, with delightful results, especially in the second season, as the two-year-old plants came into flower very early in the spring. Many of our enthusiastic rosarians take exception to planting Violas with roses, but these growers are more often cultivators of roses for exhibition.

The number of really good bedding Violas is now very restricted; some of the better of the older varieties have gone out of cultivation and little has been done in late years to replace them with newer ones of merit. Varieties possessing a good tufted or procumbent habit of growth available in quantity to-day include 'Swan' (white), 'Primrose Dame' (primrose), 'Newton Mauve' (mauve), 'Maggie Mott' (light mauve), 'Admiration' (reddish-purple), 'J. B. Riding' (reddish-mauve), 'Royal Sovereign' (rich yellow), 'Linggii' (pale yellow, large, often catalogued as 'Lily'), 'Mrs. Marrison' (maroon, striped bronze and rose), 'Lady Tennyson' (white), 'Kathleen' (white ground suffused and edged rose), and 'Redbraes Bronze' (bronze).

There are several other quite good varieties but they are disposed to be of coarse growth and not by any means tufted. It is gratifying to know that the Floral Committee will make no award to a new Viola until after it has been tried at Wisley, where its true character can be determined.

I am glad of this opportunity of calling attention to the beauty and usefulness of the miniature-flowered Violas, now generally known as Violettas. These plants are hybrids of *Viola cornuta* (a Pyrenean species) and a common garden Pansy. The original hybrid, which the late Dr. CHARLES STUART raised, he named 'Violetta,' a beautiful sweet-scented white flower flushed with yellow. The plant has a tufted habit and flowers profusely throughout the summer; it comes into blossom just a little late, but this defect, if it can be described as such, is amply compensated for by the chaste and beautiful blossoms when they are evolved.

I have been working on these plants since the early nineties, and had some good successes before the Great War. Unfortunately I lost some of my better sorts during the war, but by persistent effort since, by selection and otherwise, I have got together a large and most interesting collection embracing colours common to the ordinary Viola. They are now a source of unfailing interest to me, as they comprise blossoms of the most dainty and charming character and most of them are very fragrant. I am glad to know that Messrs. DOBBIE will be distributing ten to a dozen varieties in 1939, as so many of my friends are anxious to get them.

I have many others of later raising which I think those interested will be anxious to obtain, as they show wonderful development in colour, size and form beyond my most sanguine expectations. I have several lovely little plants with blossoms of perfect form not larger than my thumb-nail. Flowers of later developments of these Violettas include selfs, margined varieties, and bicolors as well as shaded blossoms. Some are oval, others circular, and almost every one of them is of good form. The habit of most of these newer sorts is dwarf and tufted, and the plants flower in prodigal profusion. The time is coming—at least I think so—when these pretty little Violettas will be largely grown in the rock garden. They are well suited for such use and should make the rock garden of greater interest over a longer period, as they continue to blossom freely when most other occupants of the rock garden have gone out of flower.

Violettas are used in my son's garden as an edging to his rose beds and borders, where they make a most effective display. Two-year-old plants come into flower in early spring and continue their display over a long period. They are also planted in groups in a long bed by themselves, and from time to time are grown in old stone sinks or troughs, where their free-flowering makes a delightful innovation.

There is in general cultivation to-day one of the first of my better novelties. It was named 'Rock Orange,' but the plantsman to whom my son gave some plants, before distribution, renamed it 'Buttercup,' and under this name it is now known. It is extremely free-flowering, richly scented, of an orange-yellow colour, and possesses a sturdy tufted habit. In one florist's catalogue this little Violetta was described as "a chubby little fellow."

I could say much more in regard to both the Viola and the Violetta, but I have to remember that this lecture is to have some reference to the Pansy as we know it to-day. My experience with the Pansy takes me back to the years when we were largely dependent on the raisers and growers of Scotland and the North for our novelties and for maintaining interest in Pansy flowers of good quality. The beautifully finished blooms of those days never failed to excite my admiration. The cool moist climatic conditions in the North have always been of immense advantage in growing these showy Pansies and in developing blooms of general excellence. The hotter and drier climatic conditions of the South make the cultivation of the Fancy Pansy difficult.

Messrs. ENGELMANN of Saffron Walden, Essex, have done much in recent years to arouse new interest in the Pansy. This firm have two types of the Pansy to which they devote considerable attention. Their Fancy Pansies are strikingly handsome; their strain of these plants contains numerous varieties, the flowers of which attain to the standard laid down by the old-time florists, who were very exacting in their requirements of a good type of flower. Often have I said to Mr. ENGELMANN how much I would like to go through his fields of these Pansies, and to select therefrom the plants of exceptional merit for naming as distinct varieties. The Pansy flowers he exhibits throughout the season at the fortnightly meetings and at the Chelsea Show embrace properties that the older florists set as their standard of quality. Many of these flowers attain to this standard in form and are flat and smooth without waviness or crinkled edges. Their texture is thick and velvety, the petals lying closely and evenly upon each other. The colours and markings are harmonious; the blotch is dense and solid and large enough to occupy the whole surface (except a narrow margin) of the three lower petals; the margin is of the same tone as the two top petals, and, whether broad or narrow, of equal breadth throughout. The top petals are usually veined with colour from the centre or flushed with some other colour such as rose near their edges. Flowers are frequently shown with a bright orange eye, without rays or suffusion, and the eye exactly in the centre of the flower. Some of the flowers are exceptionally large and striking without being coarse and without ragged or notched edges, crumpled petals or diffuse eyes.

Mr. ENGELMANN has another type of the Pansy ('Engelmann's Giant') which much resembles the old and once popular Show Pansy of the North. In comparison with the Fancy Pansy I think it is much inferior in quality. That it is showy cannot be denied, and it is popular without a doubt. I am only afraid it may contaminate, as it were, the fine quality of the true Fancy Pansy as grown at Saffron Walden. I am glad, therefore, to know that the two types of the plant are kept well apart.

There are many other showy types of the Pansy well known to seedsmen, raised in immense quantity annually. Most of the well-known seedsmen have their own special strains. Then there are others such as 'Roggli Strains,' 'Trimardeau Giant,' 'Bugnot's Giant,' 'Empress,' 'Cassier's Superb,' 'Covent Garden Strain,' 'Mammoth' and a host of others, all claiming distinction for some good quality or another and all contributing interest in beautifying the garden during the spring and summer months. My experience of some strains is not a happy one. They are undoubtedly very showy and attractive, but some of them suffer from a weak constitution which during a hot and trying summer season finds them unable to cope with climatic conditions, and consequently they fail.

There are also the so-called Winter-flowering Pansies which are becoming increasingly popular, as they flower during the more genial weather of late winter and early spring and are therefore a decided acquisition ; they make fine healthy plants.

The question of cultivation should be considered. A great deal depends on the thorough and proper cultivation of the soil, much more perhaps than most people would realize. Although the Viola and Pansy will grow quite satisfactorily in any good garden soil for a time, infinitely better results invariably follow when the flowering quarters are treated in somewhat drastic fashion. When the ground is deeply dug and well manured ultimate good results are largely assured.

To grow the Viola and Pansy satisfactorily the beds and borders should be bastard-trenched ; the result of taking so much trouble is invariably seen in the healthy condition of the plants later on when they are growing away freely and evolving their blossoms in the greatest profusion over a long period. The Viola and Pansy are deep-rooting, and are therefore continuously drawing on the resources of the soil to maintain themselves in health and vigour.

When trenching the soil a heavy dressing of good lasting manure should be incorporated. It should not be placed in the trench in layers but should be thoroughly mixed. It is an undoubted advantage to use ordinary well-decayed stable manure on soils heavy in character, and in light soils to make use of old cow manure.

If possible the quarters allocated should be dug over in the late autumn and be left in a rough condition during the winter for the frosts to pulverize and sweeten until the spring. They should then be lightly forked over in readiness for planting.

Planting should be put in hand from the early days of March to the beginning of April according to locality, and character of the season. I prefer the earlier date, as the plants get well established before the warm weather is with us.

I wish to emphasize the importance of changing the soil where Violas and Pansies are planted. As a rule the plants do remarkably well for two years in the same position ; but, if allowed to remain in the same quarters for a third year, not infrequently many of them fail in the height of summer when they are promising well. Many of my friends have wondered how it is that I am still growing Violas quite successfully after more than forty years in the same garden. My Violas continue to do well because the soil is changed every third year and good lasting manure incorporated when the change is made. I have no doubt that if an inquiry were made of growers who have grown these plants for years, they would reply that either the soil or the quarters were changed approximately every third year.

Bedding Violas should be planted 9 inches apart. Mulching of the beds and borders in the hot days of our English summer, especially in the South, is an immense advantage. Up to the time of mulching, a weekly hoeing between the plants assists in maintaining them in good health and is much better than watering. I avoid the use of the watering can as much as possible. Only occasionally during long periods of drought do I water my Violas, and then I give them a thorough soaking, following this with a generous application of liquid manure. This practice is always observed prior to mulching. Mulching material consists of well-rotted manure passed through a coarse sieve, also peat moss rubbed through a finer sieve in equal quantity, and added thereto a small amount of loam and sand. These ingredients are well mixed and the material is then quite ready for use. Work the mulching material well round the collar of each plant with the hands and finish off with a layer of the same material over the garden soil. This will create much cooler conditions round about the plants and provoke growth ; indeed, it will rejuvenate them.

If the plants are to continue to flower profusely, it is imperative that all spent blossoms and seed pods should be persistently removed. Failure to observe this practice will result in the plants deteriorating in a little while. It is a somewhat tedious process, but with practice quite a large number of plants may be attended to during an ordinary evening's work in the garden. It is well worth while as it prolongs the period of flowering.

Propagation by cuttings is a very simple matter. Most Violas and Pansies provide a large number of basal shoots from which the cuttings are made. These basal shoots are of recent development and are not hollow-stemmed. Scarce exhibition varieties are sometimes propagated from hollow-stemmed growths. Frequently plants are cut back to provide a large number of young short-jointed shoots, and from these basal shoots the rooting results are most satisfactory.

I prefer cuttings about 2½ inches long ; such cuttings have their lower leaves trimmed off and are cut through the stem with a sharp knife just below a joint. Propagation is often begun too soon, long before the plants have regained their vigour after a season's flowering. I seldom put in any cuttings until September, and I have found after many years' experience that cuttings inserted in October, and as late as the end of November, root very readily and develop beautiful stocky plants in the following spring.

The cuttings should be inserted in light sandy soil in a cold frame, but the depth of the compost should be at least 3 inches or more. The soil should be made firm and a layer of silver sand distributed over the surface. Observe a distance between the cuttings of about 2 inches, and when inserting them press the soil firmly at the base of each cutting. Water in with a fine-rosed can, cover with a framelight and keep close until rooted. From time to time admit air to the frame and in this way avoid damping off.

Another simple method of propagation is to insert the cuttings in shallow boxes accommodating about sixty cuttings inserted in rows ; provided the stock is healthy all the cuttings root. The boxes should be placed in a cold frame until the cuttings are rooted. As the days lengthen in February and early March evidence of growth is visible. It is then the practice to transplant these box-rooted cuttings into soil placed in cold frames, observing a distance of about 3 inches between the plants set out in rows. After watering in, the frame-lights are placed over them until they get nicely established. Air is then admitted and they are gradually inured to hardier conditions. A few weeks of such treatment brings into being a grand lot of plants with a mass of roots giving assurance of a successful future.

Propagation by seeds is a very simple affair. The chief concern should be to get seed of the very best type, as better quality plants are just as easily raised as those of less merit.

I have sown seeds at all seasons with success. For early displays in the succeeding year June and July are excellent months for sowing seed of Violas and Pansies. Seed may be sown in cold frames and in boxes, with equal success. Prick off the seedlings—as soon as the third leaf has developed—into boxes, and afterwards place the boxes in cold frames. The seedlings will be large enough to plant outdoors in the early autumn and will come into flower in the early spring.

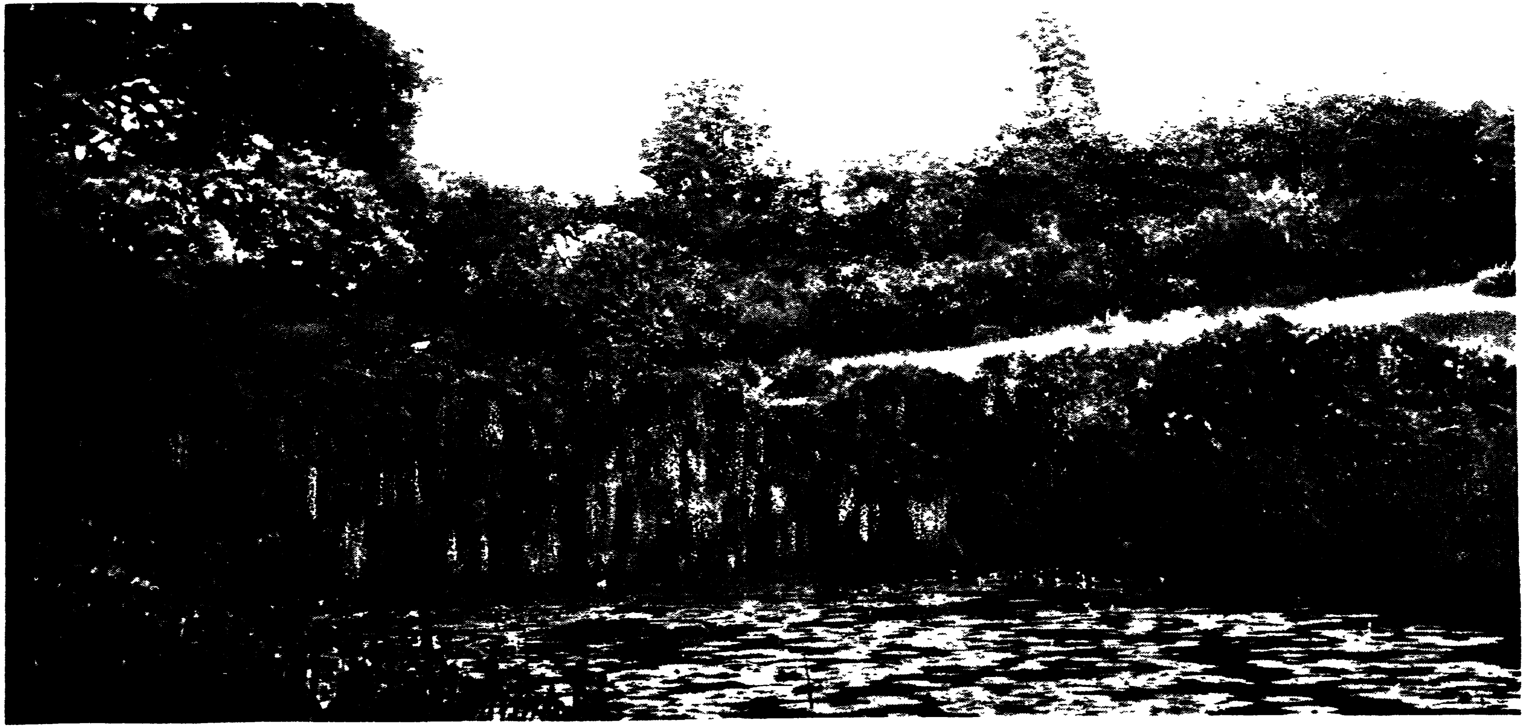

FIG. 13.—WISTARIA FLORIBUNDA ON BRIDGE AT WISLEY

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Fig. 14 Gaulnettya Wisley Pearl in flower, June

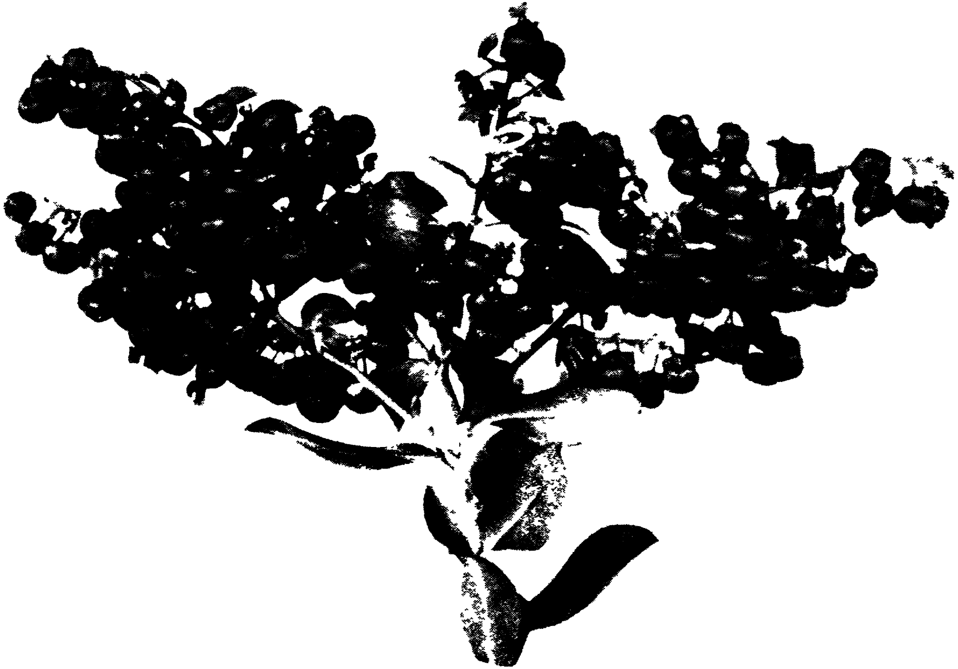

Fig. 15. Gaulnettya Wisley Pearl in fruit November

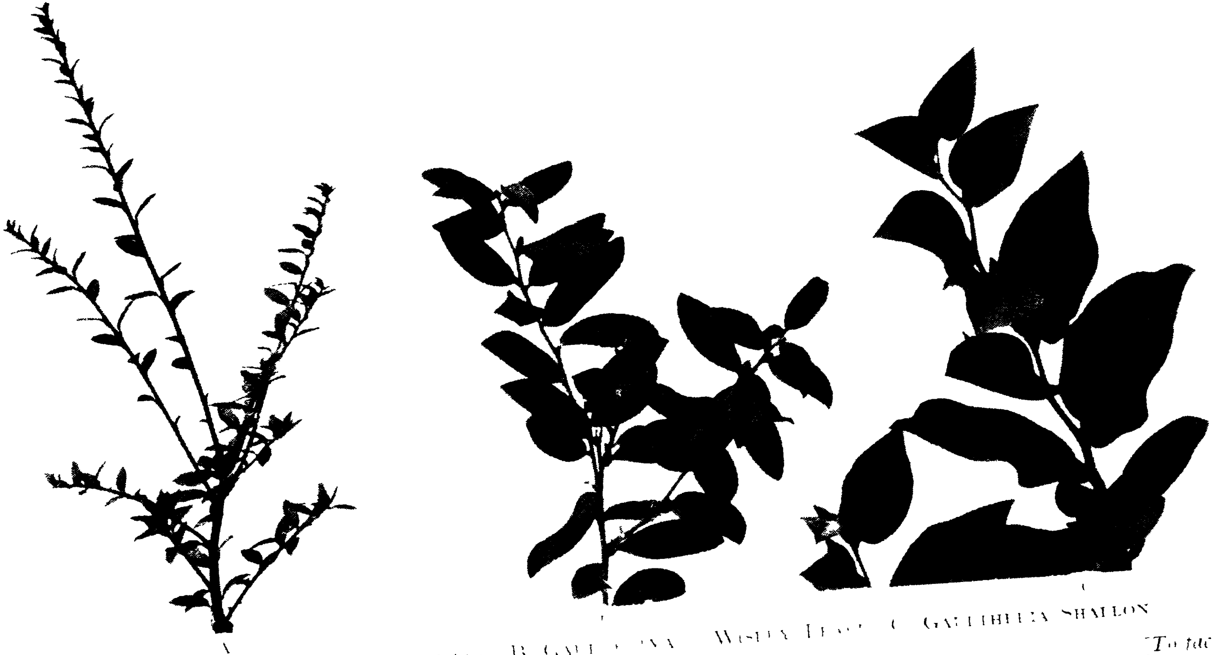

FIG. 16.—A, PERNETTYA MUCRONATA. B, GAULNETTYA, WISLEY PEARL. C, GAULTHERIA SHALLON.

[To face p. 125.

A PROBABLE BIGENERIC HYBRID BETWEEN GAULTHERIA AND PERNETTYA.

By B. O. Mulligan, N.D.H.

For several years the plant which is the subject of this note has been growing on a mound in the Wild Garden at Wisley where many Ericaceous plants thrive, among them *Gaultheria Shallon, Pernettya mucronata*, and *Pieris japonica.* In appearance it is a small, rather bushy shrub of stoloniferous habit, about 3 feet high, with evergreen, tough, elliptic and pointed leaves, inclined to a wavy margin, about an inch long.

It first flowered in 1929 with racemes of pearl-white blossoms in June, which in later years have been most profuse (fig. 14), succeeded by an equal quantity of maroon- or vinous-purple fruits in autumn (fig. 15). Since the plant was not recognized at Wisley a fruiting specimen was sent to the Herbarium at Kew, where the comment was made that it matched nothing there, but the fruit combined characters of the two genera Gaultheria and Pernettya. Several years later the Royal Botanic Gardens, Edinburgh, received similar material and considered the plant to be of hybrid origin.

With these suggestions in mind, a review of the potential parents was made, when having regard to the appearance, botanical characteristics of the plant in question, and the neighbouring shrubs, only those mentioned in the first paragraph could be regarded as probable. Further, of those three, *Pieris japonica* could be ruled out because its flowering period is approximately three months earlier at Wisley than either of the two remaining shrubs.

The supposition that *Gaultheria Shallon* Pursh and *Pernettya mucronata* (Linn. f.) Sprengel * have been naturally cross-pollinated to produce this hybrid is founded both on the morphological evidence of the plant itself and on that of open-pollinated seedlings subsequently raised from it. In the plant itself many botanical characters are either intermediate between these two or closely resemble one or the other. Examples of the intermediate state are seen in the foliage (fig. 16), inflorescence, pedicels, calyx, corolla, style, and fruit (fig. 17). The influence of *Gaultheria Shallon* is shown in the dull, dark green undulated leaves reticulate on both surfaces, the racemose inflorescence both puberulous and slightly glandular, the presence of glands on the pedicels, pubescence on the basal part of the filaments and around the style, the projection of the latter in fruit, and the fleshy development of the calyx with ciliate and acuminate sepals. Characters of *Pernettya mucronata* appear in the pubescent and strigose young branches, mucronate leaves puberulous on the midrib above but glabrous beneath, filaments abruptly narrowing upwards from a wide base, the smooth, slightly angled berries thickly clustered in pseudo-paniculate fashion towards the tops of the branches, and ripening at the same season. An interesting point is noted in the anthers of this shrub, where the cells may produce no pollen and the apical awns are often malformed. Suppression or sub-development of the sexual organs is not uncommon in hybrids, but despite this fact in the present instance fertile seeds are freely produced.

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* The authority for *Pernettya mucronata* (Linn. fil.). This is commonly attributed to Gaudichaud (Ann. Sci. Nat. v. 102, 1825) but is not found there, where he merely states, " il est probable que les Arbutus mucronata, microphylla, etc. . . ." In Index Kewensis the combination is cited from G. Don (Gen. Syst. iii. 836) (1834 or 1835), but was first made by Sprengel (Syst. Veg. Cur. Post. 158, 1827), and should therefore be quoted as above.

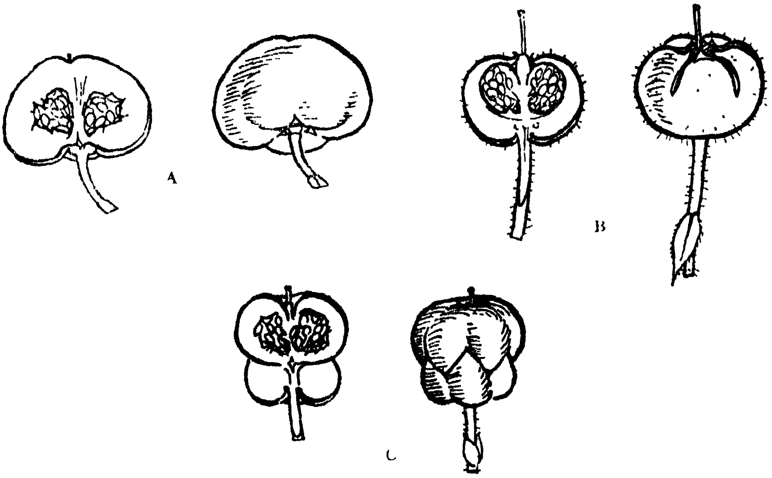

FIG. 17.—A, FRUIT OF PERNETTYA MUCRONATA; B, FRUIT OF GAULTHERIA SHALLON; C, FRUIT OF GAULNETTYA × WISLEY PEARL.

About 1930 seeds from this plant were collected and sown, the several resultant seedlings being placed near to the parent and under similar conditions of semi-shade and acid soil, with rather more moisture at the roots. There now remain four of these second generation plants, and as may be seen from the photograph there is considerable variation in size and shape of the foliage from Pernettya towards Gaultheria (fig. 16). Besides this it is interesting to note that the one (G P2) which most approaches Pernettya in leaf-form also possesses a hypoderm beneath the leaf-epidermis, a feature which occurs in *P. mucronata* but not in *G. Shallon*, the parent, or in the other seedlings. Three of the F2 generation of seedlings have fruited, and whilst two of them closely resemble their parent in this character, with but minor variations, the third (G P2) has a red, Pernettya-like but somewhat flattened berry with a partly fleshy calyx.

Although *Pernettya mucronata* and *Gaultheria Shallon* have been artificially cross-pollinated no fruit or seeds have been produced by which the conclusions now reached might have been verified, but there is no valid reason why the supposition should be rejected. B. L. BURTT and Sir A. W. HILL * have reported the existence of no fewer than five natural hybrids between Gaultheria and Pernettya occurring in New Zealand. Prof. Sir W. W. SMITH remarked, in his Masters Memorial Lecture in November 1935, that these two genera showed such close affinity that they might well have to be united at some future time. Finally, the flowering periods of *Gaultheria Shallon* and *Pernettya mucronata* at Wisley overlap in late June.

This probable hybrid has in the past sometimes been mistaken for *Pernettya furiens* (Hook. and Arn.) Klotzsch, but the latter, besides a stiffer habit of growth and more rigid leaves, has the underside of the foliage marked by appressed bristles which are not found in the Wisley specimen.

It is not proposed to give at present a full detailed description, but as it is now in cultivation in other gardens those possessing it may like to refer to this attractive shrub by the suggested name of *Gaulnettya* × Wisley Pearl,† a name which indicates both its probable parentage and place of origin.

I have to express my sincere thanks to the Director of the Royal Botanic Gardens, Kew, and to Mr. B. L. BURTT, who read the original manuscript and made several valuable suggestions; to the Director at Wisley for his continual interest and advice, and finally to Mr. F. C. BROWN for the majority of the photographs.

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* B. L. BURTT and Sir A. W. HILL, "The Genera Gaultheria and Pernettya in New Zealand, Tasmania, and Australia," Jour. Linn. Soc. Bot., xlix. (No. 332), pp. 611–644 (Jan. 1935).

† The name *Gaulnettya wisleyensis* has been used for this plant in the Catalogue of Choice Trees, etc. (p. 83), issued in October 1937 by Mr. W. J. MARCHANT, and in the 1939 list of plants for distribution from Wisley. The name given above is to be regarded as the appropriate name.

HARDY AROIDS.

By J. W. BESANT, Glasnevin.

THE family Aroideae, or Araceae of some botanists, has a wide distribution in tropical and temperate countries.

The genera and species hardy enough to be grown in the open air in Great Britain and Ireland are not numerous and vary considerably in hardiness and in garden value. A number of them are curious rather than beautiful, but have a certain fascination for lovers of weird and unusual plants.

Hardy Aroids vary as much in their cultural requirements as they do in general appearance. A few are aquatics, others demand wet bog conditions, others succeed in what may be described as ordinary garden soil, while a few to prove really hardy, at least at Glasnevin, require warm rather dry soil at the base of a wall, or a sunny position in front of the plant houses.

The characteristic features of the flowers of the Aroids are the spadix or spike-axis on which the small inconspicuous flowers are produced and the spathe which varies in size, colour and development according to the genus.

The true flowers are small and frequently incomplete, that is to say, the staminate and pistillate flowers may be distinct from each other though borne on the same spadix. In others the flowers are perfect, stamens and pistils being contained in the same flower, which may also have minute perianth segments. In this way the genera are distinguished from each other. Often, as in the best known garden genera, the spathe is well developed and strikingly coloured, but occasionally the spadix also is coloured.

The sequence of the genera here dealt with follows that adopted in A British Garden Flora (Kirk) and has no reference to garden value, which will be noted under each genus.

Symplocarpus foetidus Nutt., the Skunk Cabbage, is a marsh plant flourishing in the wettest part of the bog garden. The spathe is lurid purple streaked or striped with light greenish-yellow, very thick and leathery, the spadix deep violet purple covered throughout with small perfect flowers. The leaves developing during the summer are ultimately up to two feet long, broadly ovate, heart-shaped, and tapered to an acute apex. The floral region of the Skunk Cabbage is interesting rather than beautiful, a close inspection being rather marred by the unpleasant odour from the flowers. The ample leaves, however, add considerably to the plant's ornamental value for planting in marshy ground near the margins of streams and ponds where the ground is always wet. It is a North American plant said to extend into North Eastern Asia and Japan.

Lysichitum americanum Hulten & St. John is probably the most striking of all hardy Aroids (fig. 18). The immense yellow spathes produced in spring and early summer never fail to attract attention. The spadix, at first enclosed by the incurving margins of the spathe, eventually protrudes, the flowers closely covering the upper third, the lower part or stalk naked. The leaves, produced as the floral parts begin to decay, reach a great size presenting a truly tropical effect in the open. It is a native of North America and Eastern Asia flourishing at Glasnevin in a wet bog under the same conditions as Symplocarpus and reproducing freely from seeds which germinate in great numbers round the parent plant

L. camtschatcense (Linn.) Schott. (fig. 19) is the plant formerly thought to be *L. camtschatcense album*, the specific name having for long been applied to the plant described above as *L. americanum* Hulten & St. John.

In *L. camtschatcense* the spathes are white, and, though scarcely equalling in size those of the yellow species, are nevertheless among the largest to be found in hardy Aroids. They appear some weeks later than those of *L. americanum*, and are followed by relatively large leaves, glaucous green rather than rich green as in the last named species. No seedlings of the white-spathed species have germinated round the parent plant, and, though sown under conditions which Nature would seem to indicate, little success has followed. The white-spathed *L. camtschatcense* is apparently a native of Kamtschatca and Japan.

Orontium aquaticum L., the so-called Golden Club, is a water plant of considerable interest and beauty, flourishing in shallow water near the edge of a pond or small lake. The leaves are long-stalked, the elliptic blade floating on the water, while the rudimentary spathe and spadix, carried on a long stem, are held well over the surface. The spathe is tubular, not enclosing the spadix which is entirely covered by small yellow flowers having from four to six segments and stamens. The golden yellow spadix and flowers have suggested the common name of Golden Club, and although the spathe is not particularly striking, a large mass when producing many flower stems is a striking feature. It is a native of North America.

Calla is a genus related to Orontium and consisting of one aquatic species, *Calla palustris*, found in parts of Europe and North America. It has creeping rhizomes from which arise the leaves, with a stout stalk bearing a broadly heart-shaped blade which is abruptly narrowed to a sharp point. The spathe is white, eventually spreading more or less horizontally; the spadix, short and thick, carried on a very short stem, is covered with small flowers, the upper ones female, the lower with stamens and pistils. When established it is an interesting and pretty aquatic.

Acorus Calamus L., the Sweet Flag, so-called from the aromatic smell of the thick spongy rhizome and leaves, is entirely different in habit from any of the foregoing. The leaves grow erect, are sword-shaped, and of a rich green colour. The stem bearing the spadix is also flattened, the spadix appearing at one side at a point about half the length of the leaves; beyond the spadix the stem becomes leaf-like. The spadix is sessile, round, tapering upwards, and is entirely covered with small green flowers each with six segments and stamens and a small ovary. An interesting rather than a striking plant, useful by the edges of ponds and streams, it occurs locally as native in Britain and Ireland. There is a handsome variety with leaves striped green and white which gives variety to the bog garden.

Acorus gramineus Sol., a native of Japan, is a dwarf species of six inches or so with grass-like leaves and correspondingly minute spadices. Here, too, there is a variegated form which is more conspicuous in the garden, flourishing in the bog quite near the water, and often submerged.

Zantedeschia aethiopica (*Richardia africana*) is the well-known 'Arum Lily' or sometimes 'Lily of the Nile.' By those who garden in cold districts it will scarcely be admitted as a hardy plant. At Glasnevin old clumps have persisted for many years under the same conditions as Crinums in a narrow border in front of the plant houses. Farther south in Ireland it is no uncommon sight to see large clumps in cottage gardens. This species is so well known on account of the popularity of its flowers for decoration at Easter as scarcely to need description. The leaf-blades, carried on stalks two feet or more long, are deeply cleft at the base, forming two lobes, tapering upwards to an acute, often recurved, point. The conspicuous pure white spathe is folded round the spadix at the base, but expands above, then tapers to a long acuminate apex which recurves like the true leaves. The yellow spadix is covered with small flowers, the upper ones bearing stamens only, the lower bearing the ovaries with the stigmas. A native of South Africa and figured in the Botanical Magazine t. 832 (1805), and even then said to have been many years in cultivation. There are dwarf varieties of this species cultivated in gardens, but I have no experience of their behaviour in the open ground nor do I know to what extent the species with coloured spathes are hardy.

Peltandra virginica Rafin. The Green Arrow Arum of North America is of value in providing variety in form among other aquatic or wet bog plants. The leaves are distinctly arrow-shaped, carried on long stalks, and are produced in abundance from the root stock. The stem, bearing at its summit the spathe and spadix, about equals the leaves in length; the spathe is green, long and narrow, practically enclosing the spadix, which has staminate flowers above and pistillate below.

A second species, *P. sagittaefolia* (Michx.) Morong., with a rather more southern range, is described as having a whitish expanded spathe, and from the description would appear to be a more ornamental plant.

Arum, the type genus of the family, is familiar to gardeners in the wild *Arum maculatum* L known as the 'Cuckoo Pint,' 'Lords and Ladies,' etc.

A. italicum Mill. resembles the common species to some extent, but the leaves are larger, unspotted and conspicuously white veined; they differ also in being less sagittate at the base. The spathe is larger, and greenish-white without spots. The spadix, surrounded at the base by the overlapping edges of the lower part of the spathe, is yellow, barren of flowers at the summit, but bearing staminate flowers lower down and pistillate flowers near the base. It is a continental species (reputed also to grow wild in Cornwall) useful in odd corners where the prettily veined leaves appear in autumn. The flowers appear in spring after the leaves begin to die down. It is an interesting winter foliage plant about a foot high.

A. maculatum L. is the commoner of the two native species. The scarlet berries are conspicuous on shady banks and the sides of ditches in autumn. The leaves resemble those of the former species, but are more arrow-shaped at the base and generally spotted. The flower scape, short at flowering time, stretches as the berries develop. The spathe is yellowish-green and spotted, the spadix purple, the flowers arranged as in *A. italicum.*

A. palaestinum Boiss., with triangular leaves on long petioles, and producing huge spathes, deep velvety black inside and blotched purple outside, is tolerably hardy in warm well-drained soil. It is an oriental species of weird and striking appearance when in flower. A few other species formerly placed with Arum have now been removed to other genera.

Helicodiceros, a monotypic genus from Corsica and Sardinia, differs from Arum in the botanical characters of the spadix.

Helicodiceros crinitus Schott., the only species, has deeply lobed rather palmate leaves of somewhat irregular outline; the petioles are mottled below like the peduncle and outside of the spathe. The inside of the large spathe is brown and covered with hairs. The spadix is shorter than the spathe and furnished with hairs at the apex. The leaves and inflorescence arise from a tuberous root, which should be planted in warm rather dry soil. Here it is one of the Aroids flourishing best at thé base of a wall.

Dracunculus vulgaris Schott., long known as *Arum Dracunculus,* has the aspect of Helicodiceros with pedately cut leaves and mottled stems. The spathe, however, is brown within and without hairs. The spadix tapers to a point where it is soft and spongy. Warm dry soil suits it. A native of Southern Europe.

Arisaema is a genus of numerous species, many of which have been deemed tender, but possibly more of them are hardy than has generally been supposed. It is distinguished by the hooded spathe and the unisexual flowers borne on different plants.

Arisaema candidissima (fig. 20), with large three-lobed pale green leaves, produces handsome white spathes and is one of the finest hardy

Aroids grown here. It flourishes in a small bog in the rock garden planted at the base of a rock supporting a bank of soil. The soil, a mixture of peat and loam, is rarely excessively wet and grows other plants well, such as Zygadenus, Primulas, Roscoea, Orchids, etc. The root stock is a tuber increasing by small tubers formed round the base. A native of China.

A. consanguinea, a taller species reaching a height of two and a half to three feet, bears large pedate leaves of several narrow segments. The spathe is green and white. This by some authorities is made synonymous with *A. erubescens* while others separate them, the latter being described as having a pink-striped spathe. As grown here the spathe is green and white.

A. triphylla, a North American species, grows to about a foot in height, the leaves trifoliate, the leaflets entire and tapered to a point, and spathes brown and green. A number of other species have recently been brought to notice but have not yet been thoroughly tested in the open here. It is likely, however, that they and other Aroids will add yet more interest to the outdoor garden because of their often handsome leaves and the unusual colour of the spathes.

Arisarum is nearly related to Arisaema, but has unisexual flowers on the same spadix. There are only two species at all well known. *Arisarum proboscideum* Savi, a native of Southern Europe, is distinguished by the spathe being swollen below but tapering above into a long narrow tail-like process. The spathe is dull bluish-white at the base, greenish above; leaves three to four inches long, narrow halbert-shaped.

A. vulgare Targ. Toz. has the spathe swollen below, constricted above where it is slightly bent inwards; the swollen part yellowish-white, the hood purple, this colour extending to the lower portion in streaks. The leaves extending well above the flowers are halbert-shaped as in the previous species, but the basal lobes are shorter and blunter. The tubers should be planted in warm well-drained soil. A native of the Mediterranean and region of North Africa.

Biarum is a genus of two or three species from Southern Europe. They are dwarf plants closely allied to Arum, but the spathe is tubular at the base, flattening out above. The pistillate flowers have a short style.

Biarum Spruneri and *B. tenuifolium* produce narrow, pointed leaves from among which arise the spathes, green or brownish-green, and an extraordinary long spadix drawn out to a fine point. They are hardy in the open and make interesting plants in pots in the Alpine house.

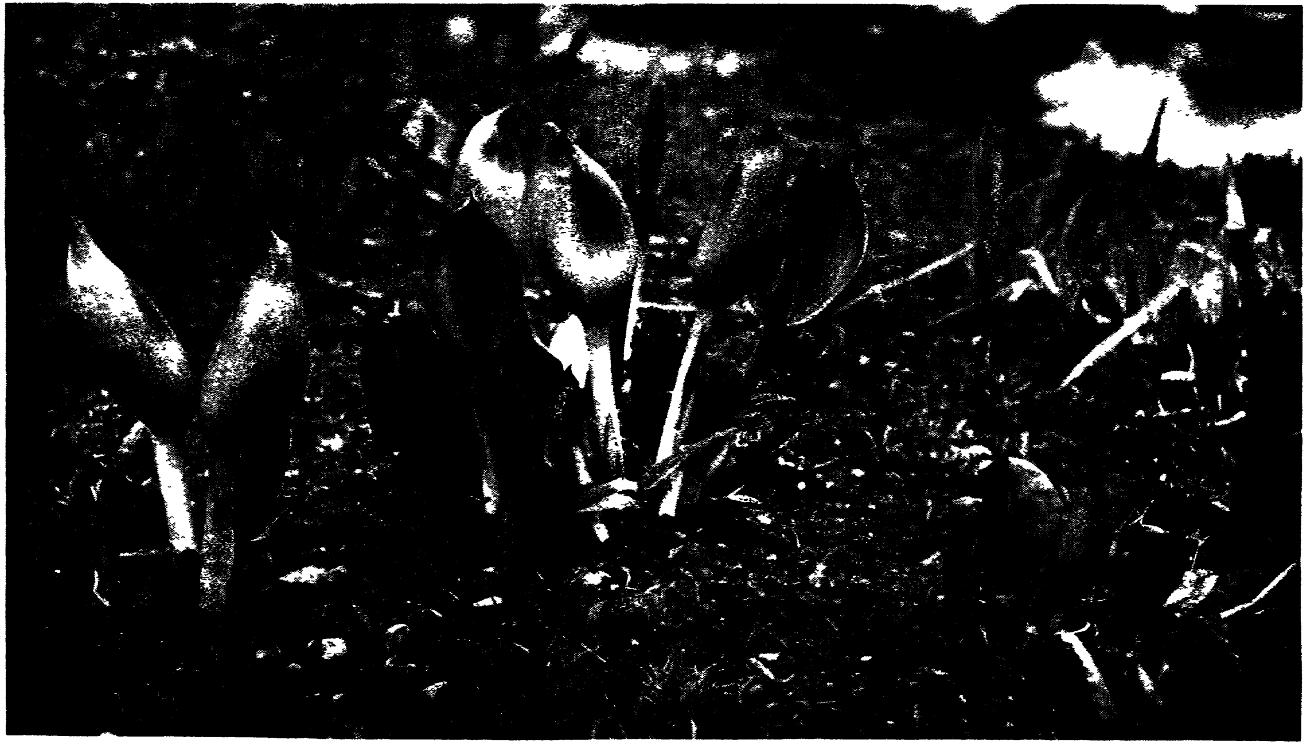

FIG. 18.—LYSICHITUM AMERICANUM

[*To face p.* 132.

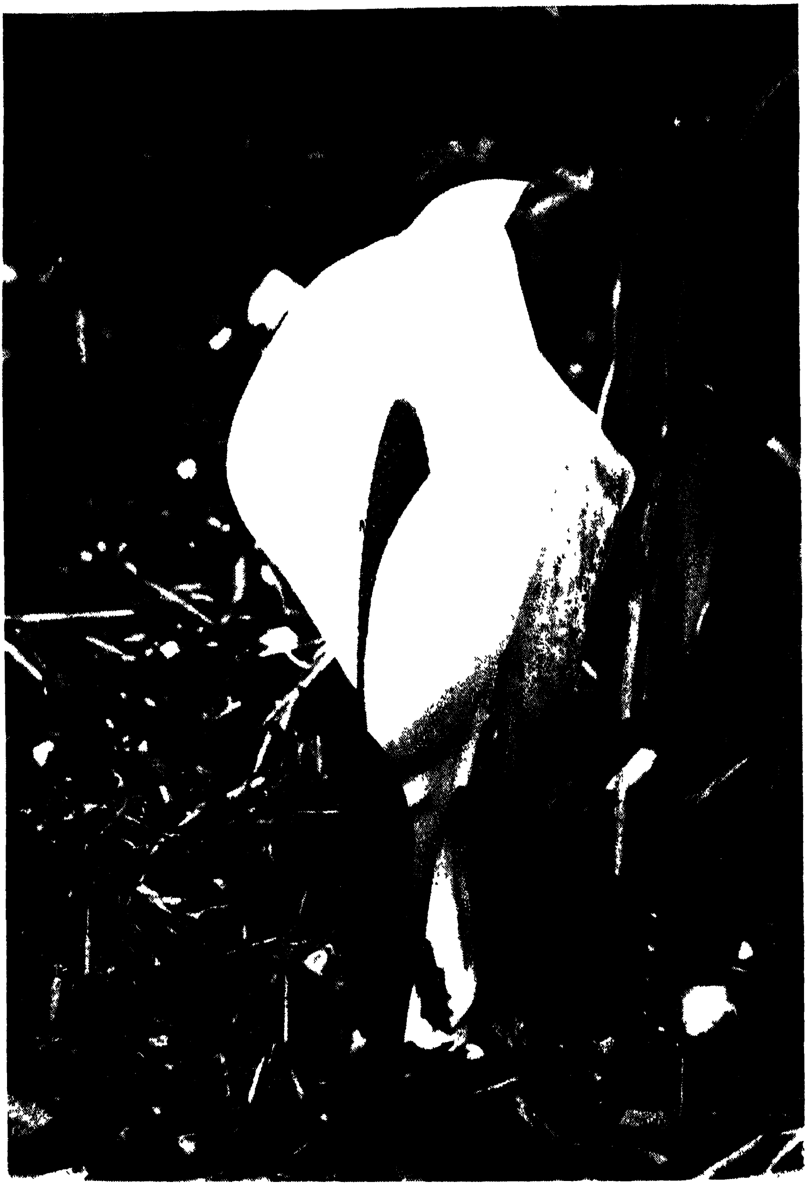

FIG. 19. LYSICHITUM CAMTSCHATENSE

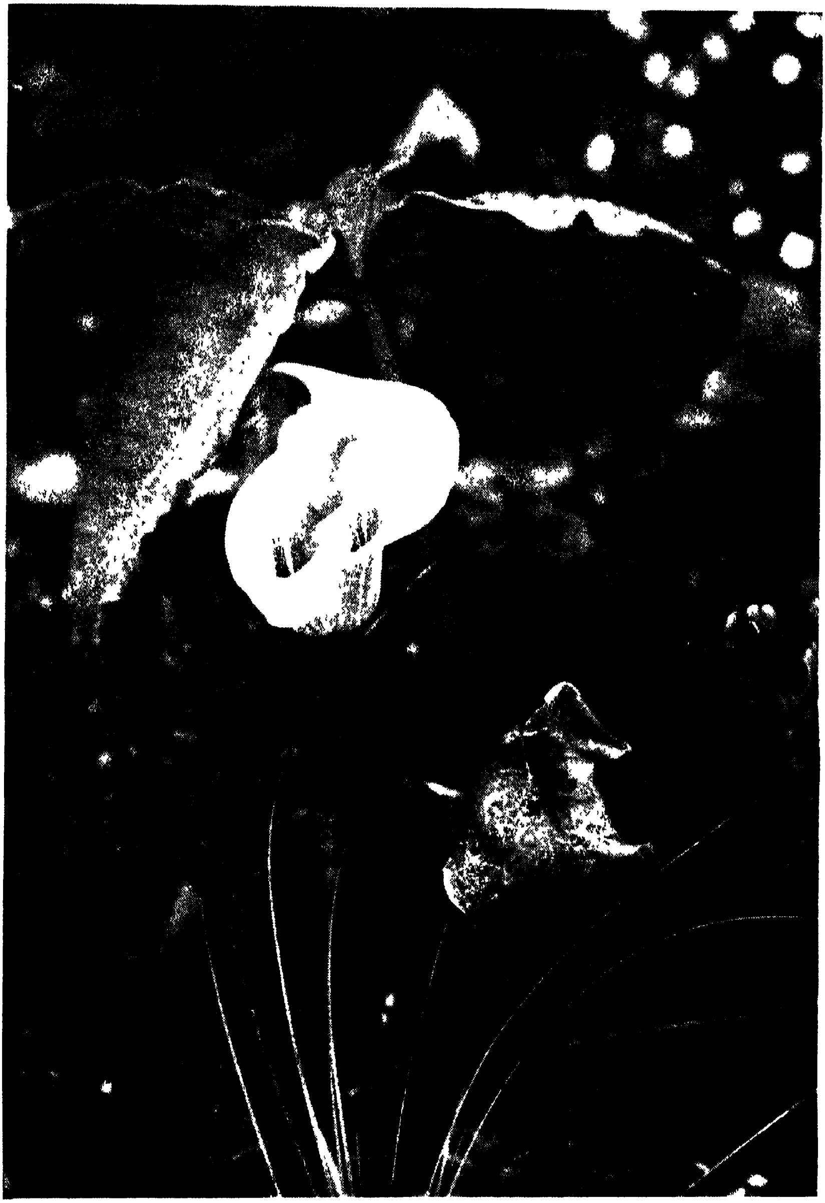

FIG. 20 — ARISAEMA CANDIDISSIMA

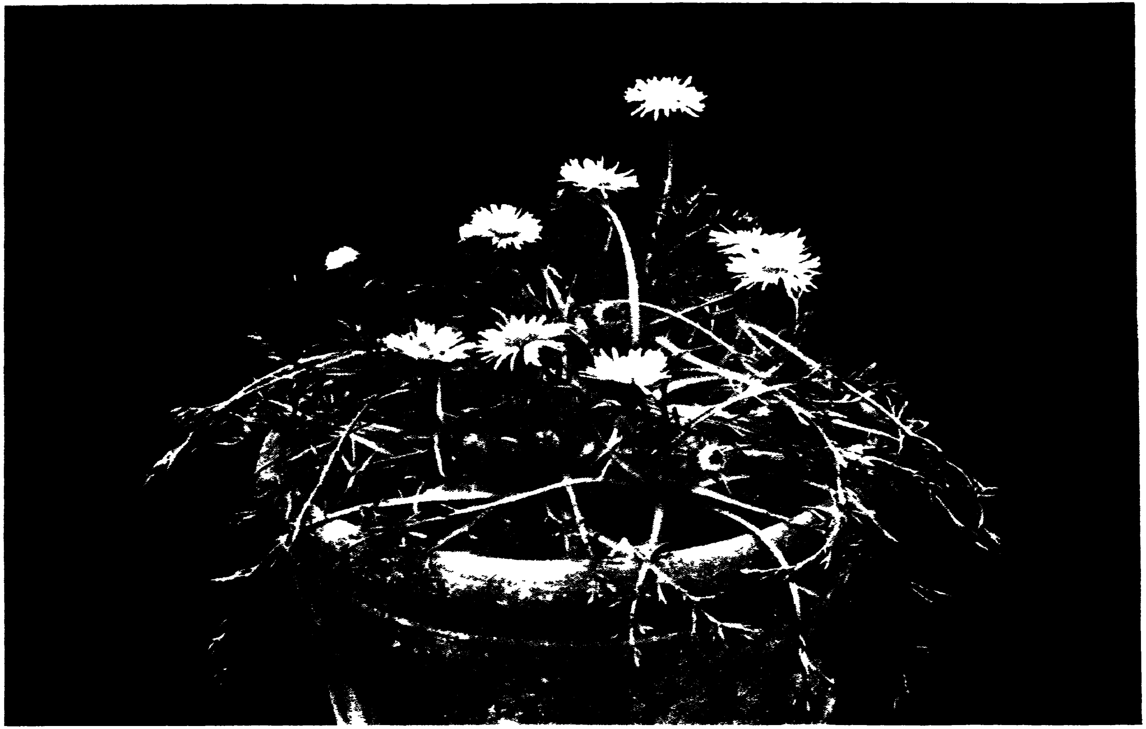

FIG. 21.—ERIGERON PINNATISECTUS

To face p. 133

TWO ERIGERONS FROM THE NEW YORK ROCKY MOUNTAINS EXPEDITION, 1936.

By J. T. WALL.

Erigeron uniflorus LINN. (*E. simplex* GREENE 1897). This beautiful Erigeron was received as *E. simplex* No. 119, and has unfortunately been distributed privately and through the trade under this name which must give place to the earlier name of Linnaeus. It is difficult to realize how the mistake arose as most of the American Floras refer to the synonymity.*

E. uniflorus is a most useful ornamental plant for the rock garden, the large violet-blue, usually solitary flowers being exceptionally showy. Foliage spatulate or oblanceolate, hairy, forming dense tufts 6 to 9 inches across. An additional attraction in this useful alpine is the large imbricate involucral bracts which are densely covered with white woolly hairs. It has a wide distribution through the mountains of Alaska, California and Montana, and occurs more sparsely in Europe, where it keeps to the exposed rocky slopes, thereby guiding us in the selection of a suitable site and soil conditions. Apparently there is a variety of this species with purple-black hairs on the involucral bracts in place of the usual white, which is known as *E. melanocephalus*.

Erigeron sp. No. 124, also from this expedition, is a most interesting member of the 'Compositus' section that was identified at Wisley by Mr. R. TWEED, as *E. pinnatisectus* NELSON (*E. compositus* v. *pinnatisectus* GRAY). Probably the first time that this Erigeron has been introduced into our gardens, it is too early to make any definite statement as to its behaviour. Plants at Wisley made strong lush growth. The pale green, coarsely cut, erect and spreading foliage forms tufts some 10 inches across, with but little signs of flower until late September. The pale mauve flowers are borne stiffly erect on 4- to 6-inch stems and measure about 1 inch across (fig. 21). Seeds of *E. pinnatisectus* were collected on Medicine Bow Mts., being practically confined to the screes and shingle slopes. Somewhat similar conditions will prove the most satisfactory over here, for in any depth of garden soil the plants become coarse and produce little floral display, while a specimen lifted and potted into a scree mixture in September is now (November) flowering quite freely in the Alpine House. My acknowledgments are due to Mr. N. K. GOULD for the photograph and to Mr. R. TWEED for his ready help.

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* *E.g.*, NELSON and COULTER'S Fl. Rocky Mts. and STANDLEY'S Fl. Glacier Pk. (U.S. Nat. Herb. Vol. 22).

THE AWARD OF GARDEN MERIT.—XLVII.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

240. MAGNOLIA × SOULANGIANA.

Award of Garden Merit, June 20, 1932.

No Magnolia is more widely grown than this hybrid which was raised in 1826 by M. SOULANGE-BODIN in his garden near Paris from seed of *Magnolia heptapeta* (*M. Yulan, M. conspicua*) crossed with *M. obovata.* Like *M. obovata* the flowers are white within and purple-tinged without, and they come first in April on the naked stems, but continue to open until the end of May by which time the tree is in full leaf. The leaves are 3 to 6 inches long, about half as wide, tapered towards the apex and downy beneath, and thus intermediate in form between the parents.

The tree is a robust, spreading one, more shapely than *M. heptapeta* and hardy, and should be allowed plenty of room so that pruning need be done only to remove a branch that rubs its neighbour.

Many seedlings have been raised and the cross has been made or occurred more than once (for both the var. *nigra* and the tree known as *M.* × *Lennei* appear to have been raised by the crossing of the same two species, the one in Japan, the other in northern Italy) and there is a whole range from almost white outside to deep purple, and variation also in the width of the petals.

M. × *Soulangiana* is propagated by layers and, provided care is taken in transplanting, it will thrive in most soils, so long as they are not too dry (and not wet with stagnant water). It is one of the safest for general planting.

241. PENTSTEMON HETEROPHYLLUS.

Award of Garden Merit, February 11, 1929.

One speaks in some doubt as a rule when one calls a Pentstemon by a specific name, for confusion in the genus has been rife and the opinions of botanists as to specific limits many, but the plant to which this award has been given is well known and well marked.

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* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title Some Good Garden Plants. This can be obtained on application to the Secretary, R.H. Society, price 4*s*. Additional notes appeared in the JOURNAL R.H.S., vol. 63, pp. 190, 246, 448 and 546.

Like nearly all its genus *Pentstemon heterophyllus* is American. It was found in California and introduced by DAVID DOUGLAS, and HARTWEG also sent home seed to our Society from the Sacramento Valley. Though often seen, it is not grown nearly as much as its beauty deserves, probably because it is not very permanent—a characteristic shared by many Pentstemons in British gardens—but it is easily raised from seed and may be raised from cuttings. The seed is sown under glass in February or March.

P. heterophyllus is a plant for the well-drained border, in full sun, and does best in sandy soil, grows to about 8 inches in height with slender wiry stems, narrow lanceolate entire opposite leaves and terminal racemes of flowers. The peduncles are generally one- but sometimes two-flowered, and the flowering time is August and September.

The great charm of the plant is in the colour and disposition of the flowers. They are over an inch long, with a narrow tube and a funnel-shaped mouth somewhat two-lipped. The colour is soft blue overlaid eventually with soft amethyst--a lovely thing.

P. heterophyllus is figured in the Botanical Magazine, t. 3853.

242. PRUNUS SARGENTII.

Award of Garden Merit, November 12, 1928.

This Japanese Cherry has at least two excellent claims to a prominent place in our gardens. It flowers profusely in April and has brilliant autumn colouring in September, for it is one of the first trees to turn in early autumn. Furthermore it is not particular as to soil so long as the drainage is good, makes a shapely tree, and is hardy. It can be grown either as a bush or as a standard, and as a standard in its native Japan it attains the size of a timber tree, but that need not deter us from planting it for garden ornament since it flowers when quite young and grows only moderately quickly in English gardens.

The deep blush-pink flowers are produced in short-stalked umbels of four to six, each flower on its inch-long stalk. They are an inch or so in diameter, and appear before the leaves are well expanded. The leaves are sometimes reddish as the buds burst, but there is variation in this character as in others, and it is perhaps well to select one's tree in the nursery and better that the nurseryman should propagate only from the best forms. The leaves are perfectly smooth, up to 4 inches long, with a pair of glands on the petiole near the rounded base of the blade, and with the tip drawn out into a long point. The reddish bracts, glandular on their margins and about ½ inch long, add to the colouring of the tree when in flower.

It was sent to Kew in 1893 by Prof. SARGENT of the Arnold Arboretum after whom it was named and is figured in the Botanical Magazine, t. 8411. It was shown at Vincent Square in 1921 by the Hon. VICARY GIBBS when it received the **A.M.** and in 1925 from the same source it was given the **F.C.C.**

243. SYRINGA 'MADAME LEMOINE.'

Award of Garden Merit, July 5, 1937.

This requires only the ordinary treatment of the Lilac and is a fine double-flowered white variety raised and distributed by M. LEMOINE of Nancy half a century ago and was given **A.M.** in 1891 and **F.C.C.** in 1894. It is thus well tried and would be put among the best six Lilacs by most growers of these fine shrubs in England, on the Continent or in America.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Cymbidium × **'Rio-Rita' var. 'Radiant.' F.C.C.** January 10, 1939. This beautiful hybrid, obtained by crossing *Cymbidium* × 'Ruby' with *C.* × 'Pearl,' carried an arching spike of nine well-formed deep-rose flowers flushed with crimson, the comparatively large labellum heavily blotched and marked with crimson. Exhibited by Messrs. McBean, Cooksbridge.

Cypripedium × **'Akeley,' East Burnham var. A.M.** January 10, 1939. This well-proportioned flower has the dorsal sepal pale apple-green at the base, and the petals and labellum yellowish with brownish shading. It is the result of crossing *Cypripedium* × 'Grace Darling' with *C.* × 'Josette,' and was exhibited by H. Barnard Hankey, Esq., East Burnham Park, Bucks.

Cypripedium × **'Green Dragon.' A.M.** January 24, 1939. This distinct hybrid was obtained by crossing *C.* × 'Grace Darling' with *C.* × 'Walter Moore.' The large round dorsal sepal is flat, and pure white, except for a small greenish area at the base. The petals and labellum are honey-yellow. Exhibited by Lionel de Rothschild, Esq., Exbury, Southampton.

Cypripedium × **'Helen P. Dane.' A.M.** January 10, 1939. A beautiful and distinct hybrid, clear honey-yellow tinged with gold. The dorsal sepal has a narrow cream-white margin. It results from the crossing of *Cypripedium* × 'Grace Darling' with *C.* × 'Lady Chesham,' and was exhibited by Messrs. Black & Flory, Slough.

Lycaste × **'Sir Jeremiah Colman.' F.C.C.** January 24, 1939. This charming addition to the genus results from the crossing of *L. lanipes* with *L. Skinneri alba magnifica.* The robust plant bore four well-formed flowers of thick texture, all the segments white with a very faint tinge of green, the latter colour derived from the *lanipes* parent. The labellum has a light-yellow crest. Raised by the exhibitor, Sir Jeremiah Colman, Bt., Gatton Park, Surrey.

Philageria × **Veitchii. A.M.** January 24, 1939.—From Sir John Ramsden, Bt., Gerrards Cross. A remarkable bi-generic hybrid, raised by Messrs. Veitch at Chelsea from *Lapageria rosea* crossed with the pollen of *Philesia buxifolia,* and first described and figured in Gard. Chron. 1872, p. 358. The hybrid is intermediate in habit between the parents, producing from the base long, flexuous growths requiring support. The petiolate leaves are oblong-acute, strongly 3-nerved and of leathery texture. The pendulous, waxy, narrowly funnel-shaped flowers are deep purplish-rose, smaller and, apparently, less freely produced than those of the seed-parent.

***Primula sinensis 'Queen of the Pinks.' A.M.** January 16, 1939, after trial at Wisley. Raised and sent by Messrs. Sutton, Reading. Plant vigorous but of compact habit, 9 inches high with the flowers borne well above the foliage. Flowers semi-double, 1¼ inch across, Mallow-purple (B.C.C. 630/1), margins of petals lightly cut; very free-flowering.

* After trial at Wisley.

DAHLIAS AT WISLEY, 1938.

The number of varieties in the trial was two hundred and sixty-six, of which sixty-six were tried for the first time. All made good growth in spite of the unfavourable season and flowered freely. The National Dahlia Society's Gold Medal for 1938 was awarded to the variety 'Fortune,' raised and sent by Mr. J. F. Barwise, Towneley Nurseries, Towneley, Burnley.

The Joint Dahlia Committee made their final recommendations for Awards on September 2, 1938. The report shows the present condition of the trials, the varieties retained for comparison and further consideration, and those discarded.

SINGLE.

The following varieties are retained :

Clematis (**A.M. 1922**).
Bishop Crossley (**A.M. 1921**)
Caldicot Castle (**A.M. 1931**).
Chancellor (**A.M. 1936**).

MIGNON SINGLE.

The following varieties are retained :

Bicolor (**H.C. 1936**).
H. J Jones (**A.M. 1926**)
Pink Gem (**H.C. 1932**).
Murello (**H.C. 1933**).
Lady Aileen (**A.M. 1926**).
Mrs. W. M. Clarke (**A.M. 1929**).
Bermondsey Gem (**H.C. 1927**).
Scarlet Gem (**A.M. 1932**).

COLLERETTE.

The following varieties are retained :

Mountaineer (**H.C. 1921**).
Scarlet Queen (**A.M. 1922**).
Carmel (**H.C. 1933**).
Tuskar (**A.M. 1922**).

ANEMONE-FLOWERED.

The following variety is retained :

Mons. C. H. Dupont (**H.C. 1922**).

SMALL-FLOWERED PAEONY.

The following varieties are retained :

Lovegold (**A.M. 1935**).
Lemon Beauty (**H.C. 1936**)
Odin (**A.M. 1936**).
Hida (**H.C. 1936**).
Sarah Peach (**A.M. 1936**).
Pinkie (**H.C. 1935**).
Our Mary (**A.M. 1931**).
Mabel Crossling (**A.M. 1931**).
Ayesha (**A.M. 1932**).
Towneley Cheer (**A.M. 1934**).
Token (**H.C. 1933**).
Newport Gem (**H.C. 1937**).
Mrs. H. C. Scrimgeour (**A.M. 1926**).
Daneway (**H.C. 1936**).
Clara Hart (**A.M. 1926**).
Babs (**A.M. 1935**).
Bishop of Llandaff (**A.M. 1928**).

The following varieties have been discarded :

Empire Glory.
Norah Dennis.
Orange Bedder (**A.M. 1931**).
Nanty (**A.M. 1935**).
Bunty.
Charmer (**A.M. 1924**).
Little Wonder (**H.C. 1932**).
Our Annie (**A.M. 1922**).

Dwarf Small-flowered Paeony.

The following varieties are retained :

Pigmy (**H.C.** 1935).
Charlotte (**A.M.** 1921).

The following variety has been discarded :

Dark-eyed Maid.

Large Informal Decorative.

Flowers Pink on Yellow.

Earl Baldwin (raised and sent by Messrs. J. Stredwick, St. Leonards-on-Sea). **H.C.** September 2, 1938.—5 feet. Flowers 8 to 10 inches diameter, soft apricot tinged pinky-mauve on pale yellow ; free and erect, on 9- to 15-inch stalks, well above foliage.

Flowers Scarlet

Gladiator (raised by Mr. C. Carlèe and sent by Messrs. H. Carlèe, Haarlem, Holland) **A.M.** September 2, 1938.—4 feet. Flowers 8 to 10 inches diameter, bright orange overlaid scarlet ; free and erect, on 9- to 12-inch stalks, well above foliage.

John Green (raised and sent by Messrs. J. Stredwick). **H.C.** September 2, 1938.—5 feet. Flowers 8 to 9 inches diameter, bright glowing scarlet ; free and erect, on 9- to 15-inch stalks, well above foliage.

The following varieties are retained :

White Abundance (**A.M.** 1935).
Stuart Ogg (**A.M.** 1937).
Nagel's Glory (**A.M.** 1934).
Pink Daily Mail (**A.M.** 1934).
Anneke.
Salmon Giant (**H.C.** 1936).
King George.
Lady Clive Wigram (**H.C.** 1937).
Fine Limburg (**A.M.** 1937).
Ballego's Glory (**A.M.** 1932).
Winona Drayson (**A.M.** 1937).
Rev. Frank Boynton.

The following varieties have been discarded :

Blanche.
Redstart.
Miss G. Kenkeel (**A.M.** 1926).
Lowfield Scarlet (**A.M.** 1934).
Molock.
Rupert Hammond.
F. Wimshurst.
Chas. A. Gillatt.
Emily Hall.
Leiden's Orange.
G. V. Sonsbeck.

Medium Informal Decorative.

Pink on Yellow.

Heather (raised and sent by Messrs. J. Stredwick). **A.M.** September 2, 1938.—6 feet. Flowers 6 to 7 inches diameter, light yellow flushed pale pinkish-mauve ; free and erect, on 9- to 15-inch stalks, well above foliage.

Cerise.

Victor (raised by Mr. C. Carlèe, introduced and sent by Messrs. H. Carlèe). **A.M.** September 2, 1938.—4 feet. Flowers 5½ to 6½ inches diameter, rich rosy-cerise, shaded orange towards the base of the florets ; free and erect, on 6- to 9-inch stalks, well above the foliage.

Rosy-red.

Janette (raised and sent by Messrs. Torrance & Hopkins, Meadow Nurseries, Busby, nr. Glasgow). **H.C.** September 2, 1938.—4½ feet. Flowers 5½ inches diameter, deep rich rosy-red; free and erect, on 9- to 15-inch stalks, well above foliage.

Flowers Scarlet.

Peggy Andrews (raised and sent by Messrs. J. F. Spencer, Hockley, Essex). **A.M.** September 2, 1938.—5½ feet. Flowers 5½ inches diameter, rich rosy-scarlet; free and erect, on 9- to 12-inch stalks, well above the foliage. (**H.C.** 1937.)

Tante Stien (raised and sent by Messrs. J. G. Ballego, Leiden, Holland). **A.M.** September 2, 1938.—5 feet. Flowers 5½ to 6½ inches diameter, bright orange-scarlet; free and erect, on 9- to 12-inch stalks, well above foliage.

The following varieties are retained:

OMAH (**A.M.** 1929).
NORTHERN BEAUTY (**A.M.** 1934)
BRIDESMAID (**A.M.** 1934).
ROMANCE.
MODERN TIMES.
VENUS (**A.M.** 1937).
LADY SNAGGE (**A.M.** 1932).
WALTER HITCHINS (**A.M.** 1936)
INTENSITY.
PATTY WAUGH.

The following varieties have been discarded:

MABEL COOK.
FLORENCE M. DAVIES (**A.M.** 1930)
LILAC LAMBOURNE
MARJORY.
HUGH REDWOOD
FANCIFUL.
ELIZABETH ARDEN

SMALL INFORMAL DECORATIVE.

Flowers Yellow.

Memorial (raised and sent by Mr. J. F. Barwise, Towneley, Burnley). **H.C.** September 2, 1938.—4 feet. Flowers 3½ to 4 inches diameter, bright lemon-yellow; free and erect, on 6- to 9-inch stalks, well above foliage.

Flowers Orange.

Cinnamon Gem (raised and sent by Mr. J. F. Barwise). **H.C.** September 2, 1938.—4 feet. Flowers 3 to 3½ inches diameter, bright orange; free and erect, on 9- to 15-inch stalks, well above foliage.

Flowers Pink on Yellow.

England (raised and sent by Mr. J. T. West, Brentwood, Essex). **A.M.** September 2, 1938.—3 feet. Flowers 3 to 4½ inches diameter, mauve-pink on pale yellow; very free and erect, on stiff 9- to 12-inch stalks, well above foliage.

Fortune (raised and sent by Mr. J. F. Barwise). **A.M.** September 2, 1938.—4 feet. Flowers 4 to 4½ inches diameter, bright salmon-pink on yellow; very free and erect on stiff wiry stalks, 9 to 15 inches long, well above the foliage. (Awarded National Dahlia Society's Gold Medal for 1938.)

Towneley Welcome (raised and sent by Mr. J. F. Barwise). **A.M.** September 2, 1938.—4 feet. Flowers 3½ to 4 inches diameter, bright rich salmon-pink on yellow; free and erect, on 6- to 12-inch stalks, well above foliage.

Flowers Orange-scarlet.

Winifred (raised and sent by Mr. J. F. Barwise). **A.M.** September 2, 1938.—4½ feet. Flowers 3½ to 4 inches diameter, rich glowing orange-scarlet; free and erect, on 9- to 12-inch stalks, well above foliage.

Fred Winter (raised by A. F. Tofield, Esq., introduced and sent by Mr. Stuart Ogg, Swanley, Kent). **A.M.** September 2, 1938.—4½ feet. Flowers 4½ inches diameter, orange-scarlet; free and erect, on 8- to 12-inch stalks, well above foliage.

The following varieties are retained:

Tip Top.
Crimson Glorious
Towneley Orange.
Towneley Cerise.
Friar's Craig (**A.M.** 1934).
Molly Plowman (**H.C.** 1936).
New Town (**A.M.** 1937).
Gladness (**A.M.** 1932).
Joan (**A.M.** 1937).
Selbourne (**A.M.** 1932).
Dyneley.
Hockley Gem.
George.
Beechfield White (**H.C.** 1935)
Ethel Windibank (**H.C.** 1934)
Calder (**H.C.** 1934).
Cavalcade (**H.C.** 1933).
Joy (**H.C.** 1936).
Elsie Crellin (**H.C.** 1937).
Naomi (**A.M.** 1934).

The following varieties have been discarded:

Bill.
George Preston.
Primrose.
Rosina.
Thelma.
Sid Bailey.
Micky.
Queen Vera.
Towneley Apricot.
Wreathwhite.

DWARF INFORMAL DECORATIVE.

The following varieties are retained:

Princess Elizabeth (**A.M.** 1931).
Catherine Clark (**A.M.** 1932).
Owlet (**A.M.** 1934).
Brentwood Scarlet (**A.M.** 1934).
Autumn Bedder (**A.M.** 1933).
Brentwood Bedder.

LARGE FORMAL DECORATIVE.

Flowers Creamy-buff.

Charles L. Mastick (raised by The Mastick Dahlia Gardens, and sent by Mr. J. B. Riding, Chingford). **H.C.** September 2, 1938.—4½ feet. Flowers 7 to 8 inches diameter, light creamy-buff shaded salmon on yellow; free and erect, on 9- to 12-inch stalks, well above foliage.

The following varieties are retained:

Jersey Beauty (**A.M.** 1926).
Robert Treat (**A.M.** 1929).

MEDIUM FORMAL DECORATIVE.

The following varieties are retained:

Mrs. David Ingamells (**A.M.** 1934).
Helly Boudewyn (**A.M.** 1937).
Susie (**H.C.** 1934).
Trevor (**A.M.** 1934).

Small Formal Decorative.

Flowers Crimson.

Basuto (raised and sent by Messrs. Wm. Treseder, Cardiff). **A.M.** September 2, 1938.—5½ feet. Flowers 4½ inches diameter, deep rich crimson; very free and erect, on 9- to 16-inch stalks, well above foliage. (**H.C.** 1937.)

The following varieties are retained:

Alpha.
Golden Nugget (**A.M.** 1934).
Jeannie (**H.C.** 1936).
Gladsome (**H.C.** 1934).
Ernest Hewitt (**A.M.** 1933)
Cardiff Beauty (**A.M.** 1935).
R. Sandford (**A.M.** 1932).
Mrs C. Hay (**A.M.** 1931).
Crusoe (**A.M.** 1933).
Princetown (**H.C.** 1936).
Hodder (**H.C.** 1936).
Indian (**H.C.** 1932).
Bountiful (**A.M.** 1936).
Mrs. F. G. Preston.
Luna (**A.M.** 1935).
Glorious (**A.M.** 1932).
Ribble (**A.M.** 1935).
Little Jean (**A.M.** 1932).
Double Caldicot Castle (**H.C.** 1936).
Tipsy (**A.M.** 1923).
Donald Clark (**A.M.** 1932).
Radium (**A.M.** 1923).
Crimson Flag (**A.M.** 1921).
Edith Cartwright (**A.M.** 1933).

The following varieties have been discarded:

Lowfield Maroon (**A.M.** 1928).
Cheal's Pink (**A.M.** 1926).
Blodwen.
Clarice.
Ruskin.
David Ingamells.
Killarney.

Dwarf Formal Decorative.

The following varieties are retained:

Flame (**A.M.** 1935).
Torquay Gem (**A.M.** 1934).

Pompon.

Flowers Yellow.

Yellowhammer (raised and sent by Mr. J. S. Wallis, Church Street, Histon, Cambs.). **A.M.** September 2, 1938.—4 feet. Flowers 2¼ inches diameter, bright yellow; very free and erect, on 6- to 12-inch stalks, well above foliage.

Little Dorothy (raised and sent by Mr. J. T. West). **H.C.** September 2, 1938.—4 feet. Flowers 2¼ inches diameter, bright rich yellow; free and erect, on 8- to 12-inch stalks, well above foliage.

Flowers Pink on Yellow.

Hockley Miniature (raised and sent by Messrs. J. F. Spencer). **H.C.** September 2, 1938.—3½ feet. Flowers 2 to 2¼ inches diameter, mauve-pink on yellowish-buff; free and erect, on 6- to 9-inch stalks, well above foliage.

Flowers Scarlet on Yellow.

Edwin (raised and sent by Mr. J. S. Wallis). **H.C.** September 2, 1938.—3 feet. Flowers 2½ inches diameter, bright scarlet on creamy-yellow; free and erect, on 9- to 12-inch stalks, well above foliage.

Flowers Crimson.

Pauline Gibbard (raised and sent by Mr. J. T. West). **H.C.** September 2, 1938.—4 feet. Flowers 2 inches diameter, bright crimson ; free and erect, on 6- to 12-inch stalks, well above the foliage.

The following varieties are retained :

ORBIT.
TARN HOUS.
YELLOW GEM (**H.C.** 1933)
LITTLE EDITH (**H.C.** 1936).
LITTLE SPITFIRE (**H.C.** 1936).
ANDREW.
IAN (**H.C.** 1933).
BILLY CLARK (**A.M.** 1933).
ROSALINDA (**H.C.** 1936).
MARS (**A.M.** 1921).
GERTRUDE (**A.M.** 1934).
DICK (**H.C.** 1932).
DORIA (**H.C.** 1936).
PUNCH.

The following variety has been discarded :

OBERON (**H.C.** 1935).

STAR.

The following varieties are retained :

WHITE STAR (**A.M.** 1921).
EPSOM STAR (**H.C.** 1928).
BOGNOR STAR (**H.C.** 1930).
RUSPER STAR (**H.C.** 1926).

LARGE SEMI-CACTUS.

Flowers Orange-pink.

Bolide (raised and sent by Messrs. D. Bruidegom, Baarn, Holland). **A.M.** September 2, 1938.—5 feet Flowers 7 to 8 inches diameter, bright glowing orange-pink ; free and erect, on 9- to 15-inch stalks, well above foliage.

Flowers Scarlet.

Scarlet Wonder (introduced and sent by Messrs. L. A. Hoek, The Hague, Holland). **H.C.** September 2, 1938.—4½ feet. Flowers 7 to 8 inches diameter, glowing scarlet ; free and erect, on 9- to 15-inch stalks, well above foliage.

The following varieties are retained :

BEAUTY OF THE GARDEN.
STARFISH.
PETER FROWD (**A.M.** 1930).
SILVER COLUMN (**A.M.** 1933).
ST. FAGANS (**A.M.** 1933).
DAWN O' DAY (**A.M.** 1934).
ALOIS NEELEN (**A.M.** 1935).
ABSOLUTE (**A.M.** 1933).
WEPEZO (**H.C.** 1936).
ROYAL VELVET (**A.M.** 1932).
MARIANNA (**A.M.** 1937).
EVELYN HANCOCK (**A.M.** 1926).
MARJORIE (**A.M.** 1932).
FRAU O. BRACHT (**A.M.** 1930).
ROBERT DAVIDSON (**H.C.** 1936).
ALEX CRAIG (**A.M.** 1932).
YOGER (**H.C.** 1935).
DULCINA (**H.C.** 1936).
BRILLIANCY (**H.C.** 1936).
LEIDEN'S ELEGANCE (**A.M.** 1934).
DANIEL BLISS (**A.M.** 1932).

The following varieties have been discarded :

MISS THEOBALD.
GRETEL.
RED FAVOURITE.
QUICKSILVER.
PEACE.
LADY HUNTINGFIELD.
LIBRA (**A.M.** 1933).
FLORENCE MCALLISTER.
FLORENCE SMITH.

Medium Semi-Cactus.

Flowers Orange.

Tropic Star (raised by Messrs. de Ruyter and sent by Messrs. Hewitt, Stratford-on-Avon). **H.C.** September 2, 1938.—4 feet. Flowers 5½ inches diameter, bright glowing orange; free and erect, on 9- to 12-inch stalks, well above foliage.

The following variety is retained:

Golden Glory.

The following varieties are discarded:

Sir S. Tennant.
Thistledown

Small-flowered Semi-Cactus.

Flowers Rose-pink.

Peaceful (raised and sent by Mr. J. T. West, Tower Hill, Brentwood, Essex). **H.C.** September 2, 1938.—3½ feet. Flowers 4½ inches diameter; light rose-pink on orange; very free and erect, on 7- to 10-inch stalks, well above foliage.

The following varieties are retained:

Kelmscott.
Horizon (**H.C.** 1932).
Doreen Crane (**A.M.** 1937).
Dearie (**H.C.** 1936).
Baby Royal (**A.M.** 1931).
Little Love (**H.C.** 1935).
Derwentwater (**H.C.** 1934)
Market Jewel.
Peter (**A.M.** 1932).
Tony (**A.M.** 1937).
Sonny (**H.C.** 1935).
Betty Coombes (**H.C.** 1933).
Marjorie Emberson (**A.M.** 1934).

The following varieties have been discarded:

Teviotdale Orange.
Margaret Woolven.
Maisie West (**H.C.** 1936).
Marigold.
Shirley.
Wasdale.
Pixie (**A.M.** 1935).
Chard Vanity (**A.M.** 1932).
White Baby Royal.
Mary Moseley.
Maisie.

Cactus.

The following variety is retained:

Miss Belgium (**A.M.** 1934).

The following varieties have been discarded:

Mascotte.
Sir Stephen Tallents.
Mme. Flore Braem (**A.M.** 1930).

BEDDING LOBELIAS TRIED AT WISLEY.

THE seed of twenty-seven stocks of Lobelias sent to Wisley for trial was sown on March 12, 1937, and the resulting seedlings were planted out on June 1, 1937. The Floral Panel of Judges examined them on July 28 and on August 19 and made the recommendations indicated below.

AWARDS, DESCRIPTIONS AND NOTES.

Flowers Blue.

CAMBRIDGE BLUE.—Plant 5 inches, of compact habit ; foliage medium green ; flowers ⅝ to ¾ inch diameter, pale Cambridge blue, eye lined white. Sent by Messrs. W. H. Simpson, Messrs. Carters Tested Seeds, Messrs. Morris, Messrs. Macdonald Seed Co., Messrs. Sluis en Groot, and by Messrs. Watkins & Simpson as CAMBRIDGE BLUE RESELECTED. All varied in shade and, except the last, in habit.

EMPEROR WILLIAM.—Plant 8 inches, of compact habit but very leafy ; foliage medium green ; flowers ⅝ to ¾ inch diameter, medium blue, eye lined white. Sent by Messrs. Daehnfeldt. Stock varied in shade.

WAVERLEY.—Plant 6 inches, of compact habit ; foliage medium green ; flowers ⅝ inch diameter, medium blue, eye lined white. Sent by Messrs. Yates. Varied in shade and in habit.

WAVERLEY BLUE IMPROVED.—Plant 6 inches, of compact habit, but somewhat leafy ; foliage medium green ; flowers ⅝ inch diameter, medium blue, eye lined white. Sent by Messrs. Clucas. Varied in shade and in habit.

Flowers Bluish-violet.

BLUE STONE.—Plant 6 inches, of compact habit ; foliage dark green ; flowers ¾ inch diameter, bright bluish-violet self. Sent by Messrs. W. H. Simpson and Messrs. Morris. Both stocks varied in shade and habit.

DWARF TRUE BLUE.—Plant 5 inches, of compact habit, foliage dark green ; flowers ⅝ inch diameter, deep rich purplish-violet. Sent by Messrs. Sluis en Groot. Varied in shade and habit.

BLUE GOWN.—Plant of 'Dwarf True Blue' habit and foliage, but flowers ¾ inch diameter, dark bluish-violet self. Sent by Messrs. Watkins & Simpson. Varied in shade and habit.

MRS. CLIBRAN.—Plant 5 inches, of compact habit ; foliage dark green ; flowers ⅝ inch diameter, violet-blue, eye creamy-white. Sent by Messrs. W. H. Simpson, Messrs. Nutting, Messrs. Harrison of Leicester, Messrs. Yates and Messrs. Sluis en Groot (a darker stock). Varied in shade and habit.

Mrs. Clibran Improved (raised and sent by Messrs. Watkins & Simpson, Covent Garden, London). **H.C.** July 28, 1937.—Plant 5 inches, of very compact habit ; foliage dark green ; flowers ⅝ to ¾ inch diameter, violet-blue, eye creamy-white.

SCHWABENMÄDCHEN.—Very closely resembles 'Mrs. Clibran' but taller, 6 to 7 inches, and somewhat leafy.

SAPPHIRE.—Plant 8 inches, of trailing habit ; foliage dark green ; flowers ⅝ inch diameter, rich violet-blue, eye creamy-white. Sent by Messrs. Sluis en Groot.

CRYSTAL PALACE.—Plant 6 inches, of compact habit ; foliage dark green tinged brown ; flowers ⅝ inch diameter, deep violet-blue, eye spotted white. Sent by Messrs. Daehnfeldt. Varied in shade.

Crystal Palace Compact (raised and sent by Messrs. Sluis en Groot of Enkhuizen, Holland). **H.C.** July 28, 1937.—Plant 6 inches, of compact habit; foliage dark green tinged brown; flowers ⅝ inch diameter, deep rich violet-blue, eye spotted white.

Dark Compact.—A selected strain of 'Crystal Palace Compact' but contained coloured rogues and varied in shade.

Mauve.

Compacta Mauve.—Plant 6 inches, of compact habit; foliage dark green; flowers ⅝ to ¾ inch diameter, bright rosy-mauve, eye lined white. Sent by Messrs. Carters. Varied to blue and in habit.

Magenta.

Pumila Magenta (raised and sent by Messrs. Sluis en Groot). **H.C.** August 19, 1937.—Plants 6 inches, of compact but leafy habit; foliage dark green; flowers ⅝ inch diameter, bright rosy-magenta, eye creamy-white Varied in shade, otherwise a good even stock.

Plant of erect loose habit, flowers medium blue.

Tenuior Compact Improved.—Plant 9 inches, of slightly compact and erect habit; foliage medium green; flowers 1 inch diameter, clear medium blue, eye creamy-white. A true even stock. Raised and sent by Messrs. Watkins & Simpson.

BOOK REVIEWS.

"Die Vermehrung der Laub und Nadelgehölze." By Fritz Brumm and Max Mann. 8vo. 81 pp. Ill. (Ulmer, Stuttgart, 1938.) R.M. 2.20.

This little book is concerned with the propagation of woody plants, especially those grown for their foliage, including conifers. The methods described are those used in the German Nursery industry.

The benefits derived from stratification of the seeds of many species are reviewed and a list is given of seeds which have proved responsive to this treatment.

A description of propagation by cuttings, grafting and budding, forms the major portion of the text. Useful lists of species that may be increased by the methods described contain some interesting inclusions—Buddleias appear in that of species propagated in winter by hard wood cuttings; in the list of shrubs and trees that can be raised from root cuttings, *Asimina triloba* appears although this plant is often raised from seeds or layers. The authors describe successful methods of grafting conifers and give details of the protection found necessary in Germany for newly grafted plants.

There are helpful illustrations. Here and there minor errors have been overlooked in the names of plants.

M. A. H. TINCKER.

"Alpine Flowers of Japan. Descriptions of one hundred select species together with cultural methods." By H. Takeda, D.I.C., D.Sc. 8vo. xiii + 202 + 11 pp. Ill. (The Sanseido Company, Tokio, 1938.) 7*s.* 6*d.*

Lovers of alpine plants are in debt to Mrs. Anley, for she stood godmother to this pleasant, instructive and often amusing book. Information in condensed form on Japanese alpine plants was sadly wanting in England, where the cultivation of alpine plants is more advanced than anywhere else in the world. We have the pick of the best, have learned to discriminate, and are at all times ready to increase our knowledge and collections.

Dr. H. Takeda has written an informative botanical account of one hundred select species, alpine as well as herbaceous, and has chosen 118 excellent photographs, taken in situ, to illustrate his subject. The illustrations are most instructive and convey to me more values of light and colour than many cheap colour plates. The student of plant geography and associations will take deep interest in the introduction, in which the strong and sound influence of Professor Schroeter, of Zurich, can be discovered.

A Tokio doctor, Dr. Okabe, is responsible for the cultural information which refers entirely to plants in pots. Apparently these are housed in lath shelters, on the flat roof of his hospital in the centre of the capital, which he compares with a dismal corner in Birmingham. A short survey of the history of the cultivation of alpines in Japan is given and general principles are laid down. It would be ungracious to criticize these empiric methods, but I may well compare them with ours.

Alpines have been cultivated before with fair success in open-air shelters. This method was used on the Continent before the advent of the alpine (glass) house and it may also be seen in England occasionally. Dr. Okabe prefers the look of the glazed pot, but knows well that unglazed pottery would win all the way. It is not at all surprising that a number of deep-rooting perennials refuse to be happy in the confined space. We would plant them in the alpine or wild garden. In Japan scoriæ or ground pumice takes the place of granitic chips used over here, and if the former are water absorbent, they would be of value, but in the meantime we may stick to our ground core or old bricks (in preference to hard baked potsherds). Summer in Tokio seems to be as unfavourable to potted plant life as November near London, and it is really surprising how many species the Doctor has been able to keep alive, even considering that sphagnum moss plays an important rôle. While cultivators in England keep alpines more or less on a lean diet, Japan feeds them well. Who knows? We may yet develop the taste of feeding Eritrichium on liquid putrid seedcake. I have practical experience of only two Japanese species in pots (although I grow about fifteen in the garden). *Rhododendron camtschaticum* from Japanese seed gave not the slightest trouble when once over the juvenile stage, and seems

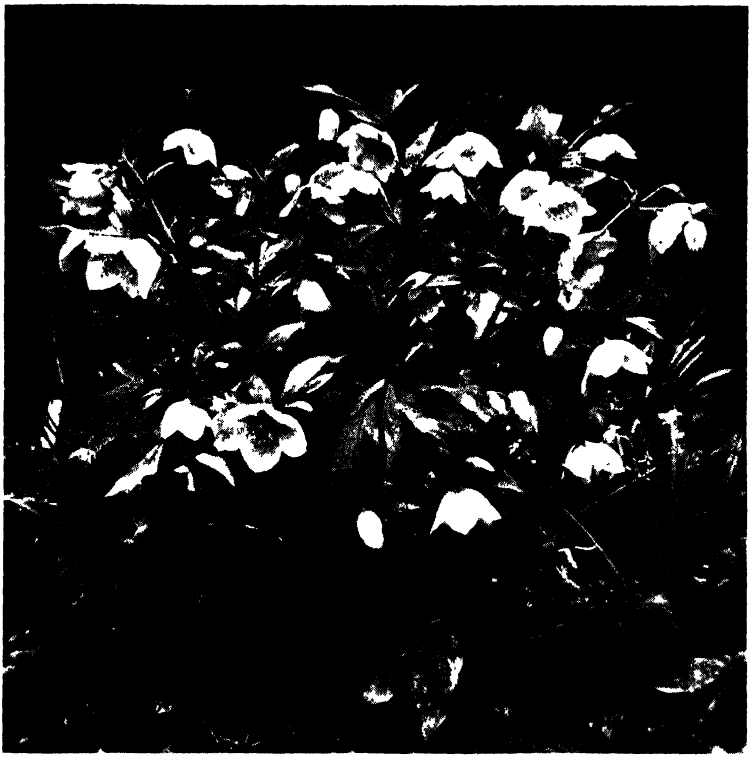

FIG. 22. A SEEDLING HELLEBORUS ORIENTALIS IN MR. MUSGRAVE'S GARDEN

To face p. 148

FIG. 23.—LEWISIAS IN MR MUSGRAVE'S ROCK GARDEN

[To face p 140

to feel happy in pots. It receives here a much larger amount of leaf mould than it would in Tokio; grit can never do harm. *Fritillaria camtschatcensis* is much happier in the scree, but it is raised here in pots. The transplanting of this or any other bulbous plant is done when at rest and not in the spring when active.

P. Rosenheim.

"The Wild Flowers of Attica." By Shirley Clifford Atchley, C.M.G., O.B.E. 4to. 60 pp. Col. ill. (Clarendon Press, Oxford, 1938.) 25*s.*

I am glad to have been given the task of reviewing this publication because, as an old friend, it gives me an opportunity of paying my tribute of admiration to a man whom I have regarded as a rare type of Englishman who served his country with credit and marked distinction for more than twenty-five years as translator, with the rank of First Secretary, in the British Legation in Athens.

He spoke and wrote Greek like a native—he was author of a book on Byron in modern Greek, and would pass as a Greek anywhere. Resident in the country for perhaps forty years, his knowledge of Greece and the Greeks, and especially Greek politics and politicians, was amazing. His personal contacts with Greeks of all classes and his sympathy and love for their country made his services priceless, and especially during the crises such as so often occurred during the War and in the Revolutionary and Republican periods which succeeded. Greeks gave him their confidence such as few if any Englishmen have enjoyed. They admired his honesty and unselfishness and would be guided by his advice. He was a good raconteur with a vein of dry humour in his stories. His ready sympathy with misfortune, his firm support of justice, all made him a living link between his own country and Greece An indefatigable walker, his Sundays were invariably spent in the hills accompanied by his children, and when I last saw him in Athens in March 1936—three months before he passed away—I remember his telling me that it was not an uncommon thing for him in the early years of his married life to carry a tired child pick-a-back. He made the hills his religion, spending his Sundays in temples not made with hands, worshipping his God in the fields, and lifting his eyes unto the hills from whence he gained his strength. He was a great wanderer in the hills of both Greece and Crete, where he was wont to spend some part of his summer holiday. On one occasion he was known to have tramped the full length of the Mount Ida range from the N.E. end to the S.W. end, a matter of forty-eight hours, twenty-four of which was actual walking, sleeping and feeding with shepherds.

The flowers of the hills inspired in him a sacred admiration for the beauties of Nature, and so it came about that he became a botanist and collector of all the wild flowers in a country he had made his home.

This subscription publication to his memory has been made possible by his gardening friends, many of them Fellows of the R.H.S. Some of these friends knew him in the hills, in his garden in Athens, or in their own homes when he was on furlough in this country, and have received plants and seeds from him sent from abroad.

In particular, mention must be made of the names of Sir Arthur Hill and Dr. Turrill, both of Kew Gardens. The former has contributed a charming and touching appreciation as a generous acknowledgment of the zeal exhibited by Atchley in successfully preserving some 4,000 sheets of pressed plants for the Kew Herbarium, whilst Dr. Turrill as editor of the publication undertook that time-consuming task as an acknowledgment for the help Atchley gave him in his studies in the flora of the Balkan peninsula.

In 1927, when he began his work, he wrote to me saying that he hoped to produce a little popular handbook of Greek flora for visitors, not botanists. Atchley realized that to many tourists visiting the ruins of Greece, the wild flowers found growing in the ruins would add to the enjoyment of their visits. It was a brilliant idea which his untimely death from heart failure when plant hunting on Mt. Kyllene has brought to an end.

It was perhaps too ambitious a venture. We are, therefore, the more grateful to Dr. Turrill for the help he has given towards the production of this book.

An unusual and valuable feature of the book is that in many cases Mr. Atchley has given the modern Greek names of the plants by which thay are known to the peasants; as far as possible scientific terms have been avoided, though references to the works of Theophrastus are taken more or less as literally translated. The book contains his description of a number of characteristic Greek flowers, with seventy-nine coloured illustrations selected from a large number by W. O. Everett.

All visitors to Greece on pleasure bent are advised to include this book in their luggage.

G. P. Baker.

"Up-to-Date Fruit Growing." By W. E. Shewell-Cooper. 8vo. 296 pp. Ill. (English Universities Press, London, 1938.) 8*s.* 6*d.*

This book is primarily written to help the beginner. The opening paragraphs on "Making a Start" are concerned with buying trees, forms of trees, planting, etc., but under the heading "Suiting the Fruit to the Soil" the author tends to give the impression that only on certain kinds of soils will the different kinds of fruit grow satisfactorily, whereas in the small garden most types of soil can by proper cultivation be made to grow hardy fruits. The planting table at the end of the first chapter serves as a useful guide for the beginner, but Mr. Cooper must have found a phenomenal variety of Strawberry which requires planting 15 to 18 feet apart!

Chapter 2 is devoted to the Apple. The question of stocks is dealt with at length, but the remarks on manuring could have been more descriptive. For instance, slow-acting nitrogenous manures such as Hoof and Horn might have been mentioned, as such are to be preferred on certain kinds of soil to the quick-acting Sulphate of Ammonia which is generally recommended. The paragraphs on "Age of Planting" and "Time of Planting" are redundant, as these were described in Chapter 1. Pruning of the established Apple tree is made clear, but the recommendation to prune the leading growths of young trees by only one-half is not likely to produce a very stout framework. In this chapter there are also a calendar of seasonal operations and a comprehensive list of varieties.

Chapters 3, 4 and 5 deal respectively with the cultivation of the Pear, Plum and Cherry. The author states that Plums can be successfully bark-ringed, although in a later paragraph on ringing he says that it is not advisable to do this operation on stone fruits.

The general management of Gooseberries, Red and Black Currants is clearly set out. In dealing with varieties of Raspberries, 'Red Cross' is mentioned as Mosaic-resisting. This is no doubt true in the sense that 'Red Cross' is rarely found free from Mosaic, but does not deteriorate in vigour to the same extent as do many other varieties. The importance of planting virus-free Strawberries is emphasized in the cultivation of this fruit, but to say that a bed can be kept down for perhaps seven years is rather extreme at the present day.

Chapters are devoted to the less grown fruits, such as the Medlar, Mulberry, Cranberry, etc.

In the chapter describing picking and storing of fruit there is a recommendation to allow early Pears to ripen on the tree. This means that most of the fruit ripens at once, whereas if successional pickings are made of the early varieties and the fruit allowed to ripen in store the season is considerably lengthened.

There is a comprehensive list of pests, diseases, and their control. The control of certain pests must be accepted with a certain amount of reservation—*e.g.*, Mussel Scale cannot be effectively controlled by spraying with a tar distillate wash in winter.

The illustrations are clear on the whole, but one is particularly misleading. The diagrams depicting the effect of Reversion in Black Currant leaves cannot be taken as typical.

J. M. S. POTTER.

"The Microscope made easy." By A. L. Wells. 8vo. 181 pp. Ill. (Warne, London, 1938.) 3*s.* 6*d.*

This is a simple clearly written introduction to the use of the compound microscope. It is purely practical and contains nothing concerning the theory of the microscope—that is not its aim. Simple objects for microscopic examination are described and the manipulations necessary to that end are detailed.

"Water Gardening." By Frances Perry. 8vo. xiv + 353 pp. Ill. (Country Life, London, 1938.) 15*s.*

One may take it for granted that water in some form, whether a stream, lake, pond or formal water garden, adds immensely to the charm of a garden. That this phase of gardening is very popular, is proved by the number of small garden owners who *must* have a small pool, even if it can only accommodate one water lily and a few goldfish.

Here a word of warning is necessary where small children are concerned, for during the past year there have been several deaths from drowning where young children have fallen into a small artificial pool. It is thus obvious that the pool should be protected in some way where toddlers are about.

" Water Gardening " includes nineteen chapters dealing in detail with all the phases of the subject; an appendix is included, giving instructions how to calculate the capacity in gallons of a pool, and also details of the materials and the amounts required to construct a pool of a given size.

There are also a glossary of botanical terms used in the book, a bibliography and a good index.

The nineteen chapters include an introduction dealing with the history of aquatics, economic values and early aquatic gardening in England.

The other chapters deal with the construction of pools, planting and propagation, designing of formal and informal water gardens, and with hardy and tender water-lilies. The last is especially valuable, for where known, the name of the raiser of a particular variety and date of its introduction are given.

One chapter is on Nelumbos and Nuphars, while others are devoted to miscellaneous and submerged Aquatics, with chapters on Hardy Ferns, Hardy Orchids, Bog or Water Insectivorous Plants, Ornamental Grasses and Bamboos suitable for water-side planting. Backgrounds and Windbreaks are also dealt with.

There is a chapter on aquaria, with lists of plants suitable for them; and diseases, pests and other troubles that afflict the occupants are adequately dealt with. Finally, there is a chapter on ornamental fish and their management.

" Water Gardening " is the first book to deal specially with this phase of gardening and really is a handbook on the same lines as several others that have appeared during recent years and, as such, is an invaluable work of reference on this particular subject, for here, in one book, is available all sorts of information that is not readily accessible to the ordinary individual.

Much careful work has gone to its compilation, for, almost without exception, the nomenclature is correct and up to date, while lists of practically all known genera and species are given, whether in cultivation or not. This should be a guide and incentive to collectors to try to introduce some of the missing subjects.

The book is well illustrated, with a frontispiece and 74 pages of illustrations, and they are all of a high standard, there being some charming examples of matured water gardens of various types. Altogether, the high standard of the book is a credit to the authoress and the publishers.

The fact that the book emanates from the " House of Perry " is sufficient guarantee that the information is correct, for that house is well known for its many charming exhibits of water plants and hardy ferns, and for its large and choice exhibits of plants suitable for furnishing aquaria, many of them rare and of botanical interest.

While it is obvious that much care has gone to the compilation of this book, there are, nevertheless, some strange lapses in the use and misuse of capitals, probably due, in part, to printer's errors and overlooked in the final proof reading.

Where so much is good, it seems invidious to call attention to such errors, but the following and other minor mistakes should be noted for correction in a future edition. On p. 32 *Nymphaea macantha*, obviously a mistake for *N. micrantha*, correctly given elsewhere. Then to the illustrations on pp. 268 and 275, *Iris Kaempferi* is given as *I. Kaemphferi*. Again to the illustration on p. 293, *Primula sikkimensis* is given as *P. sikkimensia*, although the names are correct in the text.

The following are examples where capitals are wrongly used—*Nymphaea caroliniana, N. chrysantha, N. emirensis, N. tenuinervia, N. pulcherrima, N. columbiana* and *Nelumbo pekinensis*; other examples are *Gunnera chilensis, Lemna valdiviana, Wolffia braziliensis* and *Utricularia floridana*.

On the other hand, the capitals are omitted from *Nymphaea Lotus* and *Cornus Mas*, while on pp. 255 and 256 *Aruncus sylvester* is given for *A. sylvestris*. On p. 62 *Nymphaea Burttii* is correctly given, but on the same page when referring to the late B. D. BURTT—who discovered this Nymphaea—a " t " is omitted from his name.

J. COUTTS.

" The Genetics of Garden Plants." By M. B. Crane and W. J. C. Lawrence. Ed. 2. 8vo. xxi + 287 pp. Ill. (Macmillan, London, 1938.) 12*s.* 6*d.*

The first edition of this book was published in 1934, and the new edition contains summaries of research carried out since, and a new chapter describing the chemical and genetical bases of flower colour. The preface states the twofold object of the book to be—first, to give an introduction to the essential principles of genetics and cytology; and secondly, to present an account of recent results in relation to horticulture. The title is thus not comprehensive, and it would perhaps have been truer—so far as the part referred to in it is concerned—to have written it " The Genetics of some Garden Plants." Thus, Chrysanthemums, Carnations, Calceolarias, Beans, Violas, Roses, *e.g.*, are scarcely mentioned. These omissions indicate something of what still remains to be done. While so much is unknown it is unsafe to suppose that the whole story of inheritance has been told as some would lead us to believe, and one need only quote a single sentence from this book to illustrate this idea. It is on p. 51, and is written in connexion with the Stock 'Snowflake.' " The chromosomes themselves are shown to be subject to genetic control in the same way as other structures, internal and external, of the organism." That is, the chromosomes are not the governing factors but are themselves subject to some other government.

Unfortunately, not all the new matter is indicated in the index.

" The Flowering Shrub Garden." By M. Haworth-Booth. 8vo. x + 174 pp. Ill. (Country Life, London, 1938.) 10*s*. 6*d*.

We have often sung the praises of shrubs for our English gardens and, as good wine needs no bush, we need not write a panegyric at the beginning of this brief notice of a good book. There is always a possibility, however, that one's pleasure for good wine may be diminished by its concomitants. Not so here, for the characteristics of this book only enhance our pleasure in its subject.

These characteristics are (1) the book is a personal one, written out of experience in the author's own garden, and the impression shrubs in other gardens have made upon him ; (2) the author is evidently a man of eclectic taste ; (3) he has illustrated his book with generally excellent photographs, many of which were taken by himself ; and (4) the printing is good, and the type easy to read.

The author's garden is evidently in a district favourable to some of the less hardy shrubs, and he evidently realizes that we are not all so fortunately placed. He gives us an excellent and practical chapter on " making the most of a bad site " and thus adds to the value of his book, already made valuable for the advice given on planting and maintenance, as well as by the remarks interjected here and there on the way to do things to make the surroundings of a house of enduring yet ever-changing beauty without the continual changing of the plants that do so much to form the picture. It is a book we can cordially recommend.

" Trees and Shrubs in my Garden." By T. H. G. Stevens. 8vo. 335 pp. Col. ill. (Harrap, London, 1938.) 12*s*. 6*d*.

This is another book written out of personal experience, and concerns a district not especially well favoured climatically and all the more useful for that, for experiences gained there are apt to hold good over much of our country.

There are many wise words on cultivation, pruning and the like, as well as on the making of the garden, and the bulk of the book is taken up by paragraphs on the shrubs selected for recommendation. These paragraphs give a brief and clear description of the shrub, tell the best place for it in the garden, mention any small idiosyncrasies it may possess (and there are no great ones, for shrubs possessing them are excluded), and make recommendations for pruning, and sometimes also for propagation.

There are many excellent black-and-white illustrations and some coloured ones perhaps not quite so excellent, and there are some very useful lists showing when flowers appear on the shrubs, shrubs and trees for towns, climbers, weeping trees, and so on.

Of adverse criticism we have none, and we must add a word of praise for the care expended upon the proof-reading, and the right rendering of the proper names of plants, evident without a trace of pedantry.

" Hardy Bulbs. Including Half-hardy Bulbs and Tuberous- and Fibrous-rooted Plants." Vol. III. Liliaceae. By Lt.-Col. C. H. Grey, D.S.O., F.L.S. 8vo. x + 664 pp. Col. ill. (Williams & Norgate, London, 1938.) 45*s*.

We congratulate Col. Grey upon the conclusion of the laborious task he set himself—the search for, collation, translation, and transcription of full descriptions of hardy and half-hardy bulbous plants, two volumes of which have already been noticed in our JOURNAL. This, the third and last, deals with the largest family in which plants of this type occur, the Lily family—various in habit, world-wide in distribution, and embracing many of the most beautiful of plants for our gardens. Lilies, Scillas, Erythroniums, Ornithogalums, Alliums, Muscaris, Lily of the Valley, Solomon's Seal, Asparagus, Trilliums, Tulips and Hyacinths—rob our gardens of these and gardeners of all kinds would suffer.

Anyone unfamiliar with the subject, but interested, will find cause to wonder at the industry and devotion with which the author has pursued his task, as much as at the vast number of plants belonging to this family that have been brought into our gardens. Those who have grown many will be interested to learn of others, known to botanists, likely to prove hardy, but not yet introduced. And everyone who has an interest in any of them beyond that of seeing brilliant patches of colour will find the descriptions given and the notes made out of the author's efforts to grow them very useful indeed.

" An Ecological Glossary." By J. R. Carpenter. 8vo. ix + 306 pp. Maps. (Kegan Paul, Trench, Trübner, London, 1938.) 15*s.*

Ecology, the science of relationships of organisms to environment, while not new, has reached its fullest development only during the present century, yet there has grown up a special vocabulary of vast extent, such that botanical workers in other fields are, when they attempt to enter this, confronted with a barrier almost equal to that imposed by an unfamiliar foreign tongue. The author has thus done well to bring together the terms scattered through the literature and define them. The Glossary may have perhaps another advantage, for it will show ecologists who are tempted to coin a new term whether their new coinage has already been produced to serve a different purpose—it is evident that this has occurred frequently in the past.

" Carnations for Everyman." By M. C. Allwood. Ed. 2. 8vo. 115 pp. Ill. (Allwood, Haywards Heath, 1938.) 3*s.* 6*d.*

This book is already too well known and too highly valued to need further commendation to those who grow carnations. Those who do not will be glad to know of a little book which will tell them how in clear terms, written by one who is familar with all the pitfalls that lie in the path of the adventurer upon this pleasant emprise, and who willingly gives out of his great experience.

" Weeds, Weeds, Weeds." By Sir Charles V. Boys. Ed. 2. 8vo. 113 pp. (Wightman, London, 1938.) 2*s.*

The first edition of this book is followed a year after by a second revised and enlarged not only out of the author's experiences in his fight with weeds over seventy years but by the experiences of his many correspondents. No sovereign cure for all the weeds apt to appear in a garden is here, but many valuable hints, and much entertaining matter worth perusal.

" Humus : Origin, Chemical Composition and Importance in Nature." By S. A. Waksnan. Ed. 2. 8vo. xiv + 526 pp. (Baillière, Tindall & Cox, London, 1938.) 30*s.*

A second edition of this masterly work which first appeared three years ago has soon been called for, and the author has revised what was written in the first and added much that has become accessible since, especially concerning Russian investigations. Chapter VIII on humus formation in stable manures and plant residues has been considerably enlarged, and a new chapter on humus and soil conservation has been added.

The thoroughness with which literature has been searched in preparing this account, which no one with any depth of interest in the soil and the problems of fertility can afford to ignore, may be judged by the fact that 1608 papers are quoted in the bibliography.

NOTES AND ABSTRACTS.

Azara Gilliesii. By I. M. Johnston (*Jour. Arnold Arbor.*, xix, 260–1; July 1938).—Attention is drawn to the fact that, as first noted in Hooker's Botanical Miscellany in March 1833, p. 305, this shrub is the same as the plant described the previous year by G. Don as *Quillaja petiolaris.* The proper name therefore is *Azara petiolaris* (Don) Johnston, and *A. Gilliesii* becomes a synonym.—*B. O. M.*

Hemerocallis Propagation. By W. Hayward and H. P. Traub (*Herbertia,* 1937; pp. 201–209; figs.).—The various methods of propagating Hemerocallis, including longitudinal division of the rhizome into two or four and of inducing extra buds to develop for propagation, are described and figured.—*F. J. C.*

Herbert, The Biography of the Rev. W. By A. Worsley (*Herbertia,* 1937; pp. 13–27; figs.).—An outline of Dean Herbert's life with a portrait and an appreciation of his work. The time is appropriate for 1937 was the centenary of the publication of his great book "Amaryllidaceae," with its outstanding essay, which is reprinted in this volume of Herbertia, " On Crosses and Hybrid Intermixtures in Vegetables."—*F. J. C.*

Iris susiana, its Home and Name. By G. P. Baker (*Gard. Chron.*, **102**, pp. 161–2; Aug. 28, 1937).—In the opinion of the author and of Dr. W. A. West of Beirut, in whose garden the two species were grown side by side, *Iris basaltica* is conspecific, despite slight colour differences, with *I. susiana,* and *I. kesruana,* and *I. Westii* should also be included under the oldest name, *I. susiana.* Since *I. basaltica* was collected from the northern slope of Lebanon the long doubt regarding the home of *I. susiana* has been solved; previously it has been supposed to be in Persia, and the specific name to have been derived from the city Susa, but as the Turkish word for Iris is " Susiani," this is considered to be a likely origin. In view of the known association of the Crusaders with this region it is also suggested that the plant was brought home by them and subsequently lost owing to difficulties of cultivation, thus antedating the usually accepted introduction from Constantinople to Holland in 1573 by several centuries.

B. O. M.

Linaria ventricosa Coss. et Bal. By W. B. Turrill (*Bot. Mag.*, t. 9518; April 1938).—A tall herbaceous perennial with linear leaves and spikes of yellow flowers about 1½ inch long striped with orange. Native of Morocco.—*F. J. C.*

Lonicera splendida Boiss. By J. R. Sealy (*Bot. Mag.*, t. 9517; April 1938).—A twining evergreen species from Southern Spain, with glaucous foliage and sweet-scented flowers. The flower has a yellow tube and the petals are carmine without, pinkish within. Flowering from August to November.—*F. J. C.*

Meconopsis superba King. By G. Taylor (*Bot. Mag.*, t. 9513; April 1938).—A magnificent species but monocarpic. It forms a rosette of silver leaves about 18 inches across and has large white flowers with golden stamens and a purple stigma. It is hardy, requiring a moist, well-drained soil. Native of the Chumbi district of Tibet and Bhutan. First flowered by Mr. Lofthouse.—*F. J. C.*

Myrtus Lechleriana (Miguel) Sealy (*Bot. Mag.*, t. 9523; April 1938).—A small-flowered species with leaves about ⅜ inch long, flowers clustered along the shoots, and red to black shining fruits about ¼ inch in diameter.—*F. J. C.*

Narcissus Fly Control, Lesser. By W. M. James (*Herbertia*, 1937, p. 249).—Reports that the growing of a cover of *Alyssum maritimum* over the bed apparently protected the bulbs of Vallota and Cyrtanthus from attack by this pest.—*F. J. C.*

Nerine hesseoides. By L. Bolus (*Fl. Pl. S. Afr.*, t. 683; Jan. 1938).—A new species from the Cape Province, up to 10 inches high, with long linear leaves and umbels of six to fourteen small flowers up to ⅜ inch diameter, the pink perianth segments with undulate margins. Flowers in February.—*M. S.*

Petrea, A monograph of the genus. By H. N. Moldenke (*Fedde, Repert. Sp. Nov.*, vol. xliii, pp 1–48, 161–222; Berlin-Dahlem, 1938).—The genus Petrea (Verbenaceae) consists of shrubs, trees or woody climbers native to the West Indies, Central America and northern South America. Of the 29 species distinguished by the author, 14 have been introduced into gardens; they are grown for ornament out-of-doors throughout the tropics and under glass elsewhere. The commonest is *Petrea racemosa* Nees which received an **A.M.** in Oct. 1936 (*cf.* JOURNAL R.H.S., **61**, 519) as *P. volubilis* and is figured as such in *Bot. Mag.*, t. 628; it is native to Brazil and Paraguay. *P. volubilis* Linn. (*P. Stapelsiae* Paxton) is native to Cuba, Jamaica, Martinique, Mexico, Guatemala, British Honduras, Salvador, Nicaragua, Costa Rica and Panama, and differs in its densely pubescent calyx from *P. racemosa*; it has a white-flowered var. *albiflora* (*P. arborea* f. *albiflora*). Other cultivated species which have been confused with *P. volubilis* are *P. arborea* H.B.K. (*P. erecta* Lodd.), native to Trinidad, Venezuela and British Guiana, with its white-flowered variety *Broadwayi*, and *P. Kohautiana* Presl, native to St. Croix, Antigua, Guadeloupe, Dominica and St. Lucia, with its white-flowered variety *anomala* (*P. alba* hort.). The five calyx-lobes (the epicalyx of some authors, but here regarded as the true calyx) are long and spreading at maturity and are mostly lilac; they, rather than the tubular, more quickly falling, blue to purple, occasionally white corollas, give the sprays of flowers their attractive appearance. The small projections alternating with these lobes are regarded as outgrowths from the calyx and not as vestiges of a true calyx. All the species are described in English in great detail.—*W. T. S.*

Plumeria L. **and Himatanthus** Willd., **An evaluation of the genera.** By R. E. Woodson (*Ann. Missouri Bot. Gard.*, **25**, 189–224; 1937).—The genus Plumeria as generally accepted is here divided into two: Himatanthus and Plumeria proper, both with seven species. Both groups are probably indigenous only in Central and South America, but the beauty and perfume of their abundant waxy flowers have led to their introduction into most tropical and sub-tropical countries. Most species are white-flowered, but *P. rubra*, the well-known Frangipani, has a wide range of flower colour (f. *typica*, predominantly rose; f. *lutea*, predominantly yellow; f. *acutifolia*, white; f. *tricolor*, predominantly white, but the outer margin of the petals rose); all have usually a yellow eye. Leaf outline is likewise very variable. The author considers the sixty-odd proposed "species" of Plumeria to be variants of only seven. The great variability of the genus in Haiti seems due to hybridization between two native (*P. subsessilis*, *P. obtusa*) and one introduced (*P. rubra*) species.—*W. T. S.*

Prunus dawyckensis Sealy (*Bot. Mag.*, t. 9519; April 1938).—Probably a native of West China but described from a tree growing in Col. F. R. S. Balfour's garden at Dawyck. A cherry with 3-fld. inflorescences of rather small pink flowers on ½-inch stalks, making a tree up to 16 feet high, with hairy young shoots and coarsely-toothed acuminate leaves.—*F. J. C.*

Prunus nana. By Alfred Rehder (*Jour. Arnold Arbor.*, xix, 275; July 1938).—As the specific name "*nana*" had earlier been applied to another species by Du Roi, the plant grown in gardens under this title now becomes *P. tenella* Batsch, the next oldest name available under the rules. The variety *campestris* with broader leaves and narrower sepals, its form *albiflora*, and the forms of the type *alba*, *angustifolia* (with very narrow linear-lanceolate leaves) and *Gessleriana* all fall into accord. The last-mentioned is illustrated in colour in Revue Horticole, p. 370, 1874, as *P. nana speciosa*, and in the Gardeners' Chronicle, vol. lii, p. 390, 1912, as *P. nana rubra*; it is distinguished by the carmine buds and rich red flowers.—*B. O. M.*

Rhododendron cerasinum. By J. Hutchinson (*Bot. Mag.* t. 9538; Nov. 1938).—From N. Burma. Leaves oblong, 4 inches long. Flowers campanulate, tube whitish, lobes cherry-red.—*F. J. C.*

Rhododendron phoenocodon Balf. f. et Farrer. By J. Hutchinson (*Bot. Mag.*, t. 9521; April 1938).—A near relative of *R. neriiflorum*, but with fewer flowers in a cluster, much smaller calyx and leaves more pointed. Found in North-east Burma by Reginald Farrer.—*F. J. C.*

Salvias, The Californian. By Carl Epling (*Ann. Missouri Bot. Gard.*, **25**, pp. 95–188; illust.; 1937).—This review of Salvia section Audibertia (sometimes treated as a genus, Ramona) describes eighteen species; all are beautifully illustrated, and maps show their distribution.—*W. T. S.*

Trichocaulon Marlothii forma N. E. Br. (*Fl. Pl. S. Afr.*, t. 681 ; Jan. 1938).—A dwarf succulent, branched at the ground. Branches tubercled, 2 inches long by 1¼ inch diameter. The present form differs from the type only in the colour of the corolla, which is pale green spotted dark red, with dark rims to the lobes. Related to *Trichocaulon simile*, differing in its wider-open flowers. Native in Namaqualand.—*M. S.*

Tulipa Schmidtii Fornin. By J. R. Sealy (*Bot. Mag.* t. 9535 ; Nov. 1938).—Native of Azerbaijan. Leaves numerous, narrow undulate, flowers large scarlet, with a purple yellow-bordered blotch at base, outer segments long acuminate. Makes few offsets and bulbs of short life.—*F. J. C.*

Vaccinium glauco-album Hook. f. By H. K. A. Shaw (*Bot. Mag.* t. 9536 ; Nov. 1938).—Native of Eastern Himalaya. An old introduction, recently received, again from a more easterly range. A shrub of 4 feet with leaves about 2 inches long, white beneath, flowers pinkish in axillary racemes, fruit globose, blue-black. Not very hardy.—*F. J. C.*

Viola Allchariensis var. Herzogii W. Becker. By W. B. Turrill (*Bot. Mag*. t. 9537 ; Nov. 1938).—A Viola with pale-yellow flowers, the lower petal deeper, about 1¼ inch long, spur short. Leaves narrow linear. From N. Macedonia. *F. J. C.*

Watsonia alpina. By G. J. Lewis (*Fl. Pl. S. Afr.*, t. 689).—A new species, from mountains of the Transvaal, related to *Watsonia transvaalensis* Baker and *W. Strubeniae* L. Bolus, differing from these chiefly in its broader leaves and longer and sparser spike. Up to 2 feet 8 inches tall, with pale magenta-pink flowers and yellow-margined leaves.—*M. S.*

Weigela and its akins in Japan Proper and Korea. By T. Nakai (*Journ. Jap. Bot.*, xii., pp. 1–17, 71–88 ; illust. ; Tokyo, 1936).—Following L. H. Bailey in *Gentes Herb.*, ii., pp. 38–54 (1929), the author considers Diervilla to be an exclusively American group and places the Asiatic species in three distinct genera :—Macrodiervilla Nakai (Calyptrostigma Trautv. & Mey., 1849, non Klotzsch, 1844) with *Macrodiervilla Middendorffiana* (Trautv. & Mey.) Nakai, a native of Siberia, Sakhalin, Hokkaida, and Honshu, usually called *Diervilla Middendorfiana* Carrière, as its only species ; Weigelastrum Nakai, with one species, *Weigelastrum Maximowiczii* (S. Moore) Nakai in Honshu, the main island of Japan ; Weigela Thunb. (Weigela Willd., Calysphyrum Bunge), with 15 species. *Weigela rosea* Lindl. (*Bot. Mag.*, t. 4396) is here called *W. florida* var. *pauciflora* ; *Diervilla venusta* (Rehd.) Stapf (*Bot. Mag.*, t. 9080) becomes *W. florida* var. *venusta*. Many species are illustrated.—*W. T. S.*

Zephyranthes Propagation. By H. H. Hume and J. V. Watkins (*Herbertia*, 1937 ; pp. 195–198 ; figs.).—Descriptions of various methods of propagation are given and it is concluded that vertical cutting into two, four, or eight, according to the size of the bulb, is the best measure.—*F. J. C.*

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV Part 4

April 1939

FORTHCOMING EVENTS.

With the advent of April important special horticultural shows with competitive classes are beginning in real earnest (see back of Fellows' tickets) and will continue until late autumn.

The first are the Daffodil Show and the Early Market Produce Show, and the last big events of the year, other than the usual Fortnightly Meetings, will be the Autumn Show in mid-September and the Fruit and Vegetable Show at the beginning of October.

It is not wise to prophesy with respect to the probabilities of the type and quality of the entries for a show, for the weather is a controlling factor of unknown value, but at present there are no adverse indications of anything to prevent the Daffodil Show, at which the rivalry among amateurs grows keener and keener every year in spite of all weathers, being an attractive and interesting meeting. The Show will be held on April 13 (1–7.30 P.M.) and 14 (10 A.M.–5 P.M.).

The entries will close on April 10 and schedules are obtainable from the Secretary.

From Wisley there will be a special exhibit of Pests and Diseases of Bulbs.

On the same days and hours the Early Market Produce Show with competitive classes for the market grower will be held in the Old Hall. This is a show of importance to the market industry of the country, and besides it is a good lesson in vegetable growing for the amateur.

Arrangements have been made for a lecture on "Salads and their Making" to be given on the afternoon of April 13 (at 3.30) by Mr. Ambrose Heath, and there is every prospect of an interesting practical demonstration on salad-making taking place.

On April 14, at 3.30 P.M., in the Lecture Room, there will be an informal talk on "Some Flowers in the Show" given by Major C. B. Habershon.

A Fortnightly Show will be held on April 18 (12 noon–7.30 P.M.) and 19 (10 A.M.–5 P.M.). On this occasion the Orchid Trade has offered a silver trophy for competition for an exhibit of twenty-five Odontoglossum plants (species and/or hybrids, including Odontiodas, etc.) staged by an amateur (see January JOURNAL, p. 33).

Entry forms may be had from the Secretary and must be returned not later than by the first post on Wednesday, April 12.

The National Auricula and Primula Society will also be holding its show at the same time in conjunction with the Society's Fortnightly Show. Any Fellows desirous of showing these plants may like to communicate with the Secretary of the Society—Mr. G. H. Dalrymple, The Nurseries, Bartley, Southampton.

The Lily Group will hold its first meeting of the year on April 18 at 4.30 P.M. in one of the annexes of the Old Hall. The discussion will be on the Propagation of Lilies.

On April 18 and 19 the Masters Memorial Lectures will be given by Dr. J. C. Willis, F.R.S., on "How Plants have found their Homes." For further particulars see p. 159.

On April 25 (1–7.30 P.M.) and 26 (10 A.M.–5 P.M.) the Alpine Garden Society will hold its Show in the Old Hall.

May 2 and 3 will be busy times in the Society's Halls. In the Old Hall on May 2 (1–7.30 P.M.) and 3 (10 A.M.–5 P.M.) a Fortnightly Show will be staged, and on this occasion there will be a second competition for Sewell Medals. One Medal will be offered for an amateur's exhibit and one for a trader's exhibit. The amateur's exhibit must consist of 3, and the trader's exhibit of 6, pots or pans not exceeding 12 inches in diameter if circular, or 112 sq. inches in internal area if rectangular. Only one subject should be shown in each pot or pan.

The full particulars of the competition will be found on p. 31 of the January JOURNAL.

Entries must be made on special forms obtainable from the Secretary and should be returned to him not later than by the first post on Wednesday, April 26.

There will also be a competition for Flowering Trees and Shrubs on the same day, the classes being as follows:

Class A.—8 varieties of trees and/or shrubs in bloom, grown in the open air, 1 vase of each. Rhododendrons and Azaleas excluded.

First Prize, £4; Second, £2; Third, £1.

Class B.—4 varieties of trees and/or shrubs in bloom, grown in the open air, 1 vase of each. Rhododendrons and Azaleas excluded.

First Prize, £3; Second, £1 10s.; Third, 15s.

A competitor may enter in **Class A or Class B, but not both.**

Class C.—1 vase of a tree or shrub in bloom, grown in the open air. Rhododendrons and Azaleas excluded.

First Prize, £1 ; Second, 15*s.* ; Third, 10*s.*

A competitor may not exhibit in Class C any plant which he is exhibiting in Class A or Class B.

Class D.—1 vase, pot or tub of a tree or shrub in bloom, species not introduced before 1920. Rhododendrons and Azaleas excluded.

First Prize, £1 ; Second, 15*s.* ; Third, 10*s.*

Entries for this competition must also be made on special forms obtainable from the Secretary, and should be returned to him not later than by the first post on Wednesday, April 26.

In the New Hall, on the same dates and times, the Rhododendron Association will hold its Annual Show and competitions.

On May 2, at 3.30 P.M., Mr. H. C. Green will lecture on "Town Window-Box Gardening" in the Lecture Room of the New Hall.

There will be no informal talk on the second day of this Show, the Lecture Room having been engaged prior to the general arrangements of these talks.

MASTERS MEMORIAL LECTURES.

The Masters Memorial Lectures for 1939 are to be given by Dr. J. C. Willis, F.R.S., on "How Plants have found their Homes."

Fellows should find these lectures of great interest as Dr. Willis has made a life-study of the distribution of plants.

The lectures will be given on April 18, when Sir Daniel Hall, K.C.B., F.R.S., V.M.H., will take the Chair, and April 19, when Professor F. E. Weiss, F.R.S., F.L.S., will take the Chair. They will be given at 3.30 P.M. in the Lecture Room of the Society's New Hall.

CHELSEA FLOWER SHOW.

The Chelsea Flower Show will be held in the Royal Hospital Gardens from Wednesday, May 17, until Friday, May 19. It is the intention again to send special invitations to all Fellows and Associates so that they may attend the Show on Tuesday, May 16, from 2 to 8 P.M. These special invitations will be dispatched about ten days before the Show.

The Automobile Association has kindly offered its services again, and in the May JOURNAL there will be included a special leaflet with regard to traffic regulations to be followed.

The arrangement of the entrances to the Show grounds is being reorganized this year to avoid the overcrowding caused by entering and leaving the grounds at one and the same gate on the Royal Hospital Road.

There will be an *entrance only* from the Royal Hospital Road, and an entrance from the Embankment.

The exits will be as follows:

An exit through the Ranelagh Gardens to the Chelsea Bridge Road (northern end of the grounds) and an exit at the Embankment.

This is a preliminary warning which will be made clear in the leaflet and plan to be issued with the May JOURNAL.

INFORMAL TALKS.

The first Informal Talk, which was held on February 22, was very well attended and very encouraging. It may be of interest to the Fellows to hear that amongst the flowers to which Mr. Curtis referred were Orchids, such as Cypripedium, Dendrochilum, Cattleya, some shrubs, such as *Viburnum Carlesii*, and greenhouse plants, such as *Primula malacoides* with 'Pink Sensation,' one of its latest varieties.

He also included some of the Daffodils, such as *Narcissus Bulbocodium* and 'King Alfred.'

It will be seen that the speaker took a wide range of plants. If these talks maintain the high standard with which they have begun, something of interest will always be heard.

AUTUMN SHOW.

Fellows who were able to attend the Annual Meeting will have heard the announcement that arrangements had been made to hold an Autumn Show this year in the new Exhibition Hall at Earls Court.

The Show will be held rather earlier than usual for the Society's Autumn Shows, but this is due to the dates that the Earls Court proprietors were able to offer.

The Show will take the place of the Fortnightly Show arranged for September 12 and 13, and will be held on Wednesday, September 13, Thursday, September 14, and Friday, September 15. As far as can be at present foreseen the arrangements will be very similar to those of previous Autumn Shows.

It is hoped that Fellows will make a special entry in their diaries now, and will make every effort to make this Show a success, because the Society is going to considerable financial sacrifice in making this arrangement.

ALTERATIONS IN CALENDAR OWING TO AUTUMN SHOW.

Owing to the holding of an Autumn Show the calendar arrangements for September naturally have to be adjusted.

The lecture that Mr. G. C. Taylor was to have given on September 12, on "The Modern Garden," will now be given on October 24, taking the place of Mr. E. K. Balls' lecture on "Plant Hunting in Mexico." Mr. Balls has notified the Society that he will not have returned in time.

The competition for the best group of Cacti and/or Succulents staged by an amateur has been transferred from September 12 to September 26.

EXAMINATIONS.

The Examinations held by the Society during the period under review will be the Practical Examination for the British Floral Art Diploma, on April 26 and 27.

On the afternoon of April 27 Fellows of the Society will be welcomed to inspect the work of the candidates, from about 2 to 5 o'clock.

On May 1 entries close for the Examination for the National Certificate in Elementary Horticultural Practice. This Examination is open only to candidates who have attended a full year's course of instruction in Horticulture at one or more approved Institutes for horticultural teaching.

HALL LETTINGS.

The Halls have been let as follows:

The National Rose Society will hold its Show on April 21. Particulars are obtainable from the Secretary, National Rose Society, 117 Victoria Street, S.W. 1. Fellows' and Associates' R.H.S. tickets do not admit to this Show.

An Antique Caledonian Market in aid of the Service Fellowship Association will be held on May 17 and 18. For further particulars apply to Mrs. Charles Wintour, The Grange Cottage, St. Michaels, Tenterden, Kent.

WISLEY IN APRIL.

The month of April is one of the most attractive seasons in which to pay a visit to Wisley, not only because of the lengthening spring days and increased sunshine, but also by reason of the variety of plants to be found in flower, the fresh green of the young foliage of trees and shrubs, and the quantity of bloom displayed by Daffodils, Japanese Cherries, Crab Apples, Primulas, and Lilacs, to mention only a few of the most outstanding items.

The Half-hardy House has a number of ornamental plants in flower at the present time, of which *Corydalis thalictrifolia* with soft yellow spikes and ferny foliage, the lavender-blue hybrid Pea *Lathyrus Bartonianus*, the bushy *Prostanthera Sieberi* smothered with lilac bloom, and such bulbous plants as Lapeyrousia and Babiana may be especially mentioned. The adjoining plant house contains Calceolarias, Pelargoniums and Cinerarias, with plants of *Primula obconica* and Schizanthus on trial.

One of the most showy features of the large Temperate House is the scarlet Bottle-Brush, *Callistemon citrinus splendens*, planted in the border, where also are examples of *Fremontia mexicana* bearing shallow golden cups, the fiery *Rhododendron Oldhamii* prostrate over the retaining wall, *Begonia fuchsioides* with dainty pink clusters of flowers, and *Abutilon insigne* dangling crimson bells from the roof supports.

In the Alpine House at the top of the hill above the rock garden a great number of suitable plants grow and flower freely in pots or pans. Amongst them now are species of Androsace, Dianthus and Primula, the blue *Anemone obtusiloba patula* from Burma, *Armeria caespitosa* forming a tight cushion smothered with pink blossoms, purple *Polygala Vayredae*, Ramondia and Haberlea, Daphne and Lewisia, besides other plants less well known or less conspicuous. Just outside is the collection of Tulip species which in sunshine make a brave splash of colour—red, yellow and copper predominating.

On the rock garden there is much to observe and note. Several species of Daphne, including *Daphne tangutica*, *D. Blagayana*, and *D. Cneorum*, produce their sweet-scented flower clusters in April; other shrubs are *Osmanthus Delavayi*, which should be in every garden both for its evergreen character and fragrant white flowers, and the dwarf species of Rhododendron which are chiefly grouped together in the south-east corner of the Alpine Meadow, and above the Bog in the extreme opposite corner of the Rock Garden. In this part also the American *Lysichiton americanum* is conspicuous in the earlier days of the month for its butter-yellow Arum-like spathes, and two Kingcups, *Caltha polypetala* and the double *C. palustris plena*, are almost as decorative by the ditch side. Higher up *Euphorbia epithymoides* deserves mention for its colour, and likewise the 'Prophet-Flower,' *Macrotomia echioides*, with yellow, chocolate-spotted flowers, whilst *Phlox verna*, of creeping habit and bearing rose-red flowers, and that charming hybrid Daffodil akin to *N. triandrus*, raised in New Zealand and named 'Hawera,' must not be overlooked.

April is the flowering month for the numerous varieties of *Camellia japonica*, of which a good selection will be found in the Wild Garden, both old specimens and younger examples, where they are completely hardy and bloom regularly. Another spring-flowering genus is Pieris, the most handsome at Wisley being the old *Pieris japonica*, although the more recently introduced *P. taiwanensis* may in time run it close for beauty and popularity; both have pendent tassels of white Lily-of-the-Valley-like blossoms. *Rhododendron Thomsonii* is one of the earliest of the larger species, with loose trusses of blood-red bells. The masses of *Primula denticulata*, and clumps of *Shortia uniflora grandiflora* and *S. galacifolia*, not far from the Wistaria bridge at the foot of the Alpine Meadow, are all most pleasing to the eye in their different settings.

In the Heath Garden there only remain the Tree-Heaths, *Erica australis*, *E. arborea alpina*, *E. mediterranea superba*, and the double-flowered Gorse, *Ulex europaeus plenus*, in bloom, but as all are first-class plants for any open situation in light soil and are long-lived, notice should be taken of them. The plants in Seven Acres include a fair proportion which flower now, particularly the Cydonia tribe (or Chaenomeles), of which many forms and hybrids have been raised from *Chaenomeles japonica* and *C. Lagenaria*; evergreen Berberis of the *Berberis stenophylla* group; Exochordas with white, Spiraea-like sprays; Spiraeas themselves; the many species and particularly hybrids of Crab Apples (Malus), of which *Malus* × *Lemoinei* is probably the finest in point of colour and size of flower, and the older *M.* × *purpurea* still well worth planting for profusion of flowers; *Ribes valdivianum* with pendent orange-yellow tassels; the fragrant pink *Viburnum bitchiuense*; and finally the Japanese Cherries, which are unsurpassed for effect in the landscape and provide a wide range of pink and white, single and semi-double flowers for a period of several weeks. Amongst the shrubs in Seven Acres is planted the trial of about 260 varieties of Daffodils—an arrangement which sets them off perfectly. No lover of Daffodils should fail to visit this collection, if possible in the first half of April, although the season has considerable influence upon the exact period of flowering.

It is also worth the extra walk, especially towards the end of this month, through the Pinetum to Howard's Field to see the large number of varieties of Lilac (about 120) grown there successfully for several years, as if the spring is a congenial one there is every promise of an excellent display of bloom.

R. BRADLEY, PIONEER GARDEN JOURNALIST.

By W. Roberts, F.R.H.S.

It is perhaps a little late to commemorate the bicentenary of the death of Richard Bradley, F.R.S. (1712) and first Professor of Botany at Cambridge (1724)—he in fact died on November 4, 1732. But it is not too late to attempt to do a little justice to the memory of a man who contributed much to the advancement of gardening and husbandry. He is reputed to have written nearly twenty books in octavo, four in quarto and two in folio on gardening and allied subjects—mostly within a period of about sixteen years. In his special line he was the most prolific author of his time, and revised editions of his books continued to appear years after his death.

Against the fact that his reputation was not altogether above suspicion may be set the other fact that his friends included many of the distinguished garden amateurs, scientists and others of the day. The most serious charge against him is that, according to tradition, he got himself appointed Professor of Botany at Cambridge under false pretences and that he promised to provide the University of Cambridge with a Botanic Garden. That some such promise was expressed or implied there seems very little doubt. The Grace appointing him to the office is quoted in J. W. Clark's Endowments of the University of Cambridge, 1904, p. 194, and reads as follows :

" Cum Ricardus Bradley, Societatis Regalis Londinensis Socius, in re Herbaria se peritissimum exhibuerit, atque in horto Botanico instruendo et exornando et sumptus et operam impendere spoponderit in summum hujus Academiae commodum decusque. Placeat Vobis ut professoris Botanici titulum honoris ergo apud vos consequatur."

There is nothing to show that Bradley was a member of the University ; if he had been, the Grace, as Mr. F. P. White of St. John's College tells me, would almost certainly have given his Degree and College. A Richard Bradley, son of Richard Bradley of Worthen, Salop, was admitted sizar (age eighteen) at St. John's College, June 19, 1674, from Shrewsbury School ; he matriculated in 1677 and got his B.A. degree in 1678 ; nothing more is known of him. But there is nothing definite to connect the two Richard Bradleys, and so for the present they must be regarded as different persons.

But if our Richard Bradley was not an *alumnus* of the University, he seems to have " nursed " it with characteristic zeal. In 1721—the year with which we are now more particularly concerned—he published by subscription A Philosophical Account of the Works of Nature, a large quarto volume with thirty fine copper plates in colours. The subscription price could not have been much less than a guinea ;

there were about 350 subscribers for some 550 copies. The preponderance of Cambridge men is very striking, and the author's diplomacy was still more noteworthy. He dedicated his book to CHARLES BOYLE, 4th Earl of ORRERY, who was also a subscriber, as was the great Dr. BENTLEY, the hero of a hundred fights including the epic one of Phalaris's Epistles—Master of Trinity College. The bitter and long sustained quarrel of these two men had perhaps subsided in the intervening quarter of a century. The Master's nephew, THOMAS BENTLEY, Dr. JOHN BAKER, Dr. JOHN BROCKLEBANK, Mr. LISLE, were among the Trinity men who subscribed, in addition to one for the College Library. Mr. CROWNFIELD, the University Printer—he was also a bookseller—was down for twelve copies, and many of the other names were of Cambridge men. Dr. JOHN COLBATCH, one of the Master's bitterest enemies, is not in the list, but Sir JOHN COLBATCH, M.D., is down for twenty-five copies. The two archbishops (one a former Master of St. Catherine's Hall); quite a large number of Fellows of the Royal Society, among them the President, Sir ISAAC NEWTON (six copies), and Sir HANS SLOANE, and—not to omit Mrs. SUSANNAH CENTLIVRE, the actress and dramatist—many others, titled and distinguished, form an exceptionally interesting list, a striking tribute to the position which BRADLEY held as an author.

Three years later BRADLEY was appointed Professor of Botany, with a few indefinite duties and no emoluments. It was an important appointment to him as an author, and would impress the public far more than his F.R.S. Like the much greater Dr. BENTLEY, BRADLEY had his enemies and detractors, but with this difference that BENTLEY thoroughly enjoyed fighting, even when his case was bad; BRADLEY took the line of least resistance and did not reply to attacks. Whether he delivered lectures * or whether he burked them, he would have been criticized anyway. By the irony of fate his earliest and severest critic and his most recent defender are Cambridge *alumni*, and both—at an interval of two centuries—held the Chair which he so inadequately filled. We gather the opinion of the former from The Grub Street Journal of March 19, 1730, in a review of BRADLEY'S Course of Lectures upon the Materia Medica, read in the Physick Schools at Cambridge. The writer of the facetious review, none other than Dr. JOHN MARTYN, BRADLÉY'S "deputy" at Cambridge, and his successor as Professor of Botany there, took as his text a line from Horace's Epistles, *Scribimus indocti doctique*—(" unlearned and learned, we all of us write "). He expresses his " utmost pleasure " in seeing this book, and thought it was " particularly obliging in our worthy Professor " to print these Lectures " seeing that not above three or four of our students had the pleasure of hearing them read." He goes on to say that before he got through the second page:

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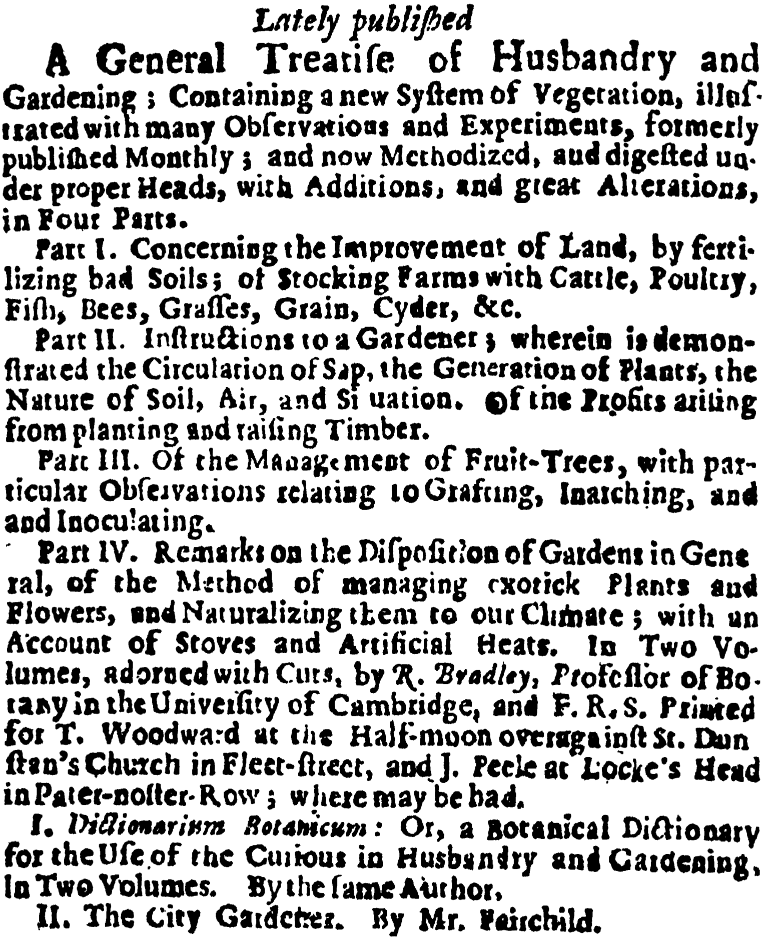
* Dr. THOMAS tells me that BRADLEY never delivered the course of lectures referred to, but used the bulk of the material in 1727 in a book entitled Ten Practical Discourses, etc. There are two MSS., one at Cambridge, and the other I bought of Mr. DOBELL. It is perfectly certain that he wrote them. The latter consists of forty folio pages, written on both sides of the paper, with two pages of coloured drawings (almost certainly by BRADLEY himself) entitled " A Course of Botanical Lectures, explaining the Principles of Vegetation, by Richard Bradley, Professor of Botany at the University of Cambridge, F.R.S." This MS. comprises twelve lectures; it is beautifully written in a very small round hand, and comprises about 60,000 words. There are scarcely any corrections, and I think the MS. may be the work of an amanuensis from BRADLEY'S original MS., and not by BRADLEY himself.

" I was charmed with the full assurance of our soon having a physic-garden; and such an one as will *become the worth and grandeur of this University*, which, no doubt, will be easily effected, if the money raised on this occasion be intrusted in the hands of our Professor, whose economy is equal to his learning, and whose integrity will be as beneficial to us as his knowledge. The book now before me gives me a great idea of his genius. For he scorns, like the vulgar writers on the Materia Medica, to copy in a servile manner from other authors; but bravely deviating from the beaten road, gives us, almost in every page, something equally new and surprising."

All this, and there is much more of it, was doubtless very diverting and greatly amused everybody—except the victim. But its truth or otherwise need not be discussed here. The first among modern students to insist on a revaluation of BRADLEY'S contribution to Botanical Science is Dr. H. H. THOMAS, F.R.S., who has done this admirably, if briefly, in The Cambridge Review of May 28, 1937. Further, Dr. THOMAS is engaged on a book on BRADLEY, and that will probably throw much fresh light on this elusive author.

It is somewhat remarkable that we know nothing of RICHARD BRADLEY'S origin or of his forbears. The late Mr. B. DAYDON JACKSON'S account in the Dictionary of National Biography is inaccurate and inadequate—surprisingly so for such an accomplished scholar. It cannot be urged that BRADLEY has been neglected throughout the ages, for the references to articles about him in BRITTEN and BOULGER'S Dictionary of English and Irish Botanists are very numerous and his books are to be found in all gardening and botanical libraries in Great Britain and the United States.

My object now is not to anticipate anything that Dr. THOMAS may have to reveal, but rather to concentrate on one of BRADLEY'S publications, which is the first gardening periodical to be established in this country, and practically the only one during the eighteenth century—for the Botanical Magazine, the oldest periodical of its kind in the world, has always been botanical rather than horticultural, and so hardly comes into the story of gardening periodicals. The publication to which I refer is A General Treatise of Husbandry and Gardening, by R. BRADLEY, Fellow of the Royal Society. The scheme extended to twelve monthly issues in octavo from April to March, at one shilling each part. The year date is carefully omitted from all the twelve title pages, but from several references in various numbers there can be no possible doubt that the publication was started in April 1721 and continued to March 1722. I had the good fortune to obtain from Messrs. WHELDON and WESLEY a copy of the November issue, stitched and uncut as it was originally issued, which has never been bound up in a volume (see fig. 25). Each number averaged over fifty pages, and the twelve numbers were afterwards bound up into two fairly substantial volumes. Each volume contained plates finely engraved by JOHN PINE—familiar to-day among book collectors for his edition of Horace, one of the most beautiful books produced in England during the eighteenth century.



Lately publiſhed

A General Treatiſe of Husbandry and Gardening; Containing a new Syſtem of Vegetation, illuſtrated with many Obſervations and Experiments, formerly publiſhed Monthly; and now Methodized, and digeſted under proper Heads, with Additions, and great Alterations, in Four Parts.

Part I. Concerning the Improvement of Land, by fertilizing bad Soils; of Stocking Farms with Cattle, Poultry, Fiſh, Bees, Graſſes, Grain, Cyder, &c.

Part II. Inſtructions to a Gardener; wherein is demonſtrated the Circulation of Sap, the Generation of Plants, the Nature of Soil, Air, and Situation. Of the Profits ariſing from planting and raiſing Timber.

Part III. Of the Management of Fruit-Trees, with particular Obſervations relating to Grafting, Inarching, and and Inoculating.

Part IV. Remarks on the Diſpoſition of Gardens in General, of the Method of managing exotick Plants and Flowers, and Naturalizing them to our Climate; with an Account of Stoves and Artificial Heats. In Two Volumes, adorned with Cuts, by *R. Bradley*, *Profeſſor* of Botany in the Univerſity of Cambridge, and F. R. S. Printed for T. Woodward at the Half-moon overagainſt St. Dunſtan's Church in Fleet-ſtreet, and J. Peele at Locke's Head in Pater-noſter-Row; where may be had.

I. *Dictionarium Botanicum*: Or, a Botanical Dictionary for the Uſe of the Curious in Husbandry and Gardening, In Two Volumes. By the ſame Author,

II. The City Gardener. By Mr. Fairchild.

FIG. 24.—NEWSPAPER ADVERTISEMENT, 1722, OF BRADLEY'S GENERAL TREATISE (enlarged).

Probably neither BRADLEY nor his publisher, J. PEELE, had any very definite idea as to how long their enterprise would last, and nowhere in the first six numbers is there any indication that they were to form a first volume; whilst each of the second six parts has the figures II on every sheet, indicating that they belonged to volume II. It is obvious that, to be a paying proposition, and the engraved plates added considerably to the cost of production, the sale at one shilling each would have to be a large one. The printer would see that the publisher paid him for his part of the job, whilst the publisher himself would want his profit; so that the unfortunate author would have to take what was left—if anything.

To get over this BRADLEY indulged in a dedication to some distinguished person for each of the twelve issues—for anything in the shape of cash which he could extract out of the twelve persons he thus honoured would be his personal perquisite. The subject of Dedications to Books is a very old one and has attracted the attention of many writers—the late H. B. WHEATLEY compiled a very interesting volume in 1887, and long before then ISAAC D'ISRAELI had dealt with it in his Curiosities of Literature. By the eighteenth century it had become a scandalous type of literary mendacity—scores of "dedications" to books were paid for which were never printed or even written; and there seems to have been no legal remedy to prevent these swindles. There were prizes to be got now and then—EACHARD for instance received £300 from GEORGE I for the dedication of his History of England, but there were not many on this scale of munificence. There was no definite rule, or scale, of charges, and presumably the author had to be content with what was given him. It was, however, a clearly recognized custom, and the payment of a cash honorarium was a matter that did not need any hint. BRADLEY had at least a faint kind of precedent, for in 1712, when ADDISON'S Spectator was reprinted in octavo, each of the eight volumes had its separate dedication to a prominent personage. BRADLEY himself did not escape, for in 1721 a pamphlet of 23 pp., The Hop Garden or Directions for Planting and Managing Hops,* was dedicated to him as "the best Writer on the Subject of Gardening that has for some Years appeared among us"; the author subscribed himself "J. A." and dated his dedication from Maidstone, May 1, 1721.

BRADLEY explains that his object in starting this publication was "to establish a general Correspondence among all the curious men in Britain in order to raise these Arts [Husbandry and Gardening] to a much higher Pitch than ever they were before." The series, as already stated, consists of twelve monthly issues, which when bound up formed two volumes, each paged continuously, Vol. I. 358 pp. and Vol. II. 372 pp. (plus seven unnumbered leaves with separate indexes to each volume). Each bore the imprint, "London; Printed for J. PEELE, at Locke's Head, in Paternoster Row. (Price One shilling.)" JOHN PEELE, it may be explained, was in business at the above address before 1722 to 1771, the year of his death; he is referred to by JOHN NICHOLS (Literary Anecdotes, iii, 737) as "a very considerable bookseller." He occasionally published books, but apparently not many, and probably this enterprise of BRADLEY'S was his most ambitious attempt in that direction.

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* This pamphlet on Hop Gardens, of which there is a copy in the London Library, had a literary and typographical importance far beyond Hops and BRADLEY. It was "Printed for J. ROBERTS, at the Oxford Arms in Warwick Lane, 1721." It is in fact one of the earliest pamphlets printed—and well printed too—by SAMUEL RICHARDSON. On p. 62 of the August-September 1724 issue of his General Treatise of Husbandry and Gardening, BRADLEY mentions this "Little Treatise" on the Hop Garden as dedicated to him, and states that "it may be had at Mr. RICHARDSON'S in Salisbury Court, Fleet Street"—a sufficient proof, I think, that it was printed by RICHARDSON. SAMUEL RICHARDSON (1689–1761), following the tradition of the Good Apprentice, married his master's daughter; he started in business on his own account as a printer in 1719; twenty or more years later he became the most widely read novelist in the world with his Pamela, 1740, Clarissa, 1748, and Sir Charles Grandison, 1753.

Without going into an elaborate bibliography of the twelve consecutive numbers, the following points may be found useful for reference purposes:

(1) April [1721]; title page and dedication to Lord CARTERET, 3 leaves; preface 3 leaves; text pp. 1–50; 1 folding plate.
(2) May; title page and dedication to Earl of STAIR, 2 leaves; text pp. 51–110; 1 plate.
(3) June; title page and dedication to Sir JOHN ANSTRUTHER, 2 leaves; text pp. 111–170; 1 folding plate.
(4) July; title page and dedication to the Hon. JAMES JOHNSTONE of Twittenham, Esqr., 3 leaves; text pp. 173–230; 1 folding plate.
(5) August; title page and dedication to the Rev. Dr. BENTLEY, Master of Trinity College, Cambridge, 2 leaves; text pp. 231–290.
(6) September; title page and dedication to Sir WILLIAM THOMPSON, Kt., Recorder of the City of London, 2 leaves; text pp. 295–358; 1 plate.
(7) October; title page and dedication to Mr. LAW, 2 leaves; text pp. 1–55; 1 folding plate.
(8) November; title page and dedication to the Rev. Mr. LAWRENCE, 2 leaves; text pp. 59–117; 1 folding plate.
(9) December; title page and dedication to Viscount CASTLEMAINE, 2 leaves; text pp. 123–181; 1 plate.
(10) January [1722]; title page and dedication to Mr. MOLYNEUX, 2 leaves; text pp. 187–246.
(11) February; title page and dedication to the Earl of DARBY (*sic*), 2 leaves; text pp. 251–310.
(12) March; title page and dedication to Sir HANS SLOANE, 2 leaves; text pp. 311–372 (plus 7 unpaged leaves at the end with a separate index to each volume).

To these must be added three others which may be regarded as supplemental, and they constituted a third volume. Two of the three have different titles and all three different imprints. It is therefore necessary to deal rather fully from a bibliographical point of view with each one.

(13) The Monthly Register of Experiments and Observations in Husbandry and Gardening. For the months of April and May 1722.
London: Printed for SAM. BRISCOE . . and sold by J. ROBERTS, 1722. Price One Shilling Six Pence.

Title, dedication to the Rt. Hon. ROBERT WALPOLE, and Preface 4 leaves; text pp. 1–87; 1 plate.

(14) Title similar to No. 13, with "For the months of June and July, 1722."

London: Printed for T. PAYNE, at the Crown, near Stationers Hall 1723. (Pr. 1s. 6*d.*)

Half title, title, dedication to Sir NICHOLAS CAREW of Beddington, 4 leaves; text pp. 1–80.

(15) A General Treatise of Husbandry and Gardening. . . . For the Months of August and September, and the remaining Part of the second year.

London: Printed for T. WOODWARD, at the Half Moon against St. Dunstan's Church, Fleet Street, and J. PEELE . . . 1724.*

Title, dedication to the Earl of BURLINGTON, 2 leaves; text pp. 1–195 + 5 unpaged leaves of Index to the three parts; 3 folding plates.

There can be no possible question about these three parts forming the continuation and conclusion of the scheme, for the author states at the end on p. 194: "This Piece, with the four preceding Monthly Remarks [*i.e.* the above Nos. 13 and 14], completes a Volume, which will be the Third and Last of my Monthly Writings." Moreover the Index bears this out.

It is reasonably certain that when RICHARD BRADLEY, doubtless with the financial backing of JOHN PEELE, embarked on his General Treatise in April 1721, he entertained great hopes of success, but the distribution of books, and more especially of pamphlets, was a serious and difficult problem, and returns slow in coming in. For the issue in bound volumes there would be a considerable demand, and it must have been in this way that the publisher would recoup himself. The primary object of No. 15 in our list was to fill up a third volume.

It is impossible to enter here into any consideration of the later editions of BRADLEY'S General Treatise. The unfortunate fact concerning Numbers 13 to 15 is that, independently paged, they have been taken by booksellers and others to be separate and distinct books, whereas they only form part of a group. In Lady ALICIA AMHERST'S History of Gardening (ed. 1910, p. 348), a copy of the April and May Monthly Register, No. 13 in the foregoing list, is stated to be "in the Sturtevant Library, St. Louis, Mo., U.S.A., and I have not seen any others." There are many others in English and American Libraries, and one—with Nos. 14 and 15—is in the London Library, St. James's Square.

BRADLEY'S ideas of editing were primitive. Though each of the fifteen parts has a month date, he seems to have used just such material as he had in hand and without regard to its seasonableness. He dealt with most subjects, and often at considerable length, of rural interest, such as saffron, bees, rabbit warrens, woods, mushrooms, fruit trees, cattle, methods of conveying water, circulation of sap in plants—a life-long obsession with him—among others. The first twelve numbers generally finish with remarks on the weather and the flowers of each month, with notes on such matters as he came across in his visits, and these are often very interesting. He tells us (in April) that Mr. GILMAN of Brentford brought 10 dozen of large cauliflowers to market in March, "and has continued to supply the Town to this Day, tho' the Neat House Gardeners are now only beginning to cut." In his next issue he tells us that "Green Gooseberries first came to the markets about the Beginning [of the month] at 2/- per quart," and "Foreward Pease at half-a-guinea per pottle." In August "The West India Pine Apples, or Ananas, continue ripening at Sir MATHEW DECKER'S at Richmond." In November Mr. FOWLER, gardener to Sir NATHANIEL GOULD at Stoke Newington, "had some Cucumber Plants in great Forewardness, and about the end [of the month] Fruit appear'd upon them"; and on January 1 FOWLER presented his Majesty with "a Brace of Cucumbers wellgrown"; whilst in March Mr. MILLET of North End, near Fulham, had ripe cherries and green abricots and Rose-buds "as there was in his Father's time." These little items of news were evidently appreciated, and when BRADLEY started his second series he induced his friend THOMAS FAIRCHILD of Hoxton—the outstanding nurseryman of the day—to supply a list of the plants flowering in his gardens at Hoxton each month, and these lists, and very long ones they are, appear in each part Nos. 13 to 15.

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* The only copy I have seen has this date.

Among the BRADLEY problems which call for solution—and so far have called in vain—is that of his residence. Nowhere in his General Treatise does he even indicate this. His experiments in husbandry and gardening must have been on an extensive scale. In his Philosophical Account of the Works of Nature, 1721, he alludes to his own collection which he had got together "with more than ten years Pains and Expense." In his June Treatise he writes of having (in the previous August) "picked out of my Nursery about 50 of the largest Pear Stocks I had." Elsewhere he states that his own expenses in the study of the Nature of plants and soils had cost him "upwards of £2,000." Again he refers to the experience he had "in the Culture of several thousands of *Exotick* Plants in different kinds of Conservatories." Similar passages of his experiences frequently turn up in his writings, but all are indefinite as to locality.

In this JOURNAL for November, 1896, the late Mr. F. W. BURBIDGE stated (p. 118) that BRADLEY "resided at Camden [*i.e.* Campden] House, Kensington," and leaves it at that; but that I think needs some explanation. Campden House, "extremely healthfully and pleasantly situated on a hill," and approached from the town through an avenue of trees, which extended nearly to the High Street and the Great Western Road, was built in the reign of James I by Sir BAPTIST HICKES, afterwards Viscount CAMPDEN. Towards the end of the seventeenth century Queen ANNE, then Princess of Denmark, lived here with her son the Duke of GLOUCESTER (who was born here in 1689). It passed about 1719 into the possession of Lord LECHMERE (1675–1727), the subject of an unflattering ballad, by SWIFT or GAY, "Duke upon Duke"; later on it became a famous boarding school for young ladies, and was destroyed by fire in March 1862.

There are several views of this fine house, one, *circa* 1720, in Old and New London (Vol. V, p. 132), and an excellent one from a drawing by G. F. SARGENT in the London Journal of April 19, 1862, showing it as it was in the early Victorian era. It was a palatial and imposing looking place, which only a very wealthy person could maintain; the garden and woods and home farm must have covered several acres. So far as we know, RICHARD BRADLEY was not a rich man, and the only explanation of his residing at Campden House is that he was there more as a bailiff or agent than as a tenant. Before Lord LECHMERE acquired the estate in 1719, it had been for several years in the possession or occupation of ROBERT BALLE, F.R.S.,* a friend of BRADLEY, who makes frequent references to him in his books. BALLE brought various plants and shrubs from Italy for the gardens at Campden House [by BRADLEY sometimes written Camden and at others Cambden], notably a wild vine called Labrusca by the Italians—" and I think that Sort is no where else in England." He also writes (1726), "In the Gardens (late of my worthy friend Mr. BALLE) at Cambden House, there are now growing several vines in the walls; some of which were planted there by that Gentleman's Direction," etc. The Italian green-privet, called by the Italians Olivetta, was brought from Italy by the same gentleman "among other Curiosities of the like Nature." In a chapter "Of Engines for raising of Water" BRADLEY describes and illustrates "the wonderful invention of the late Mr. SAVORY, F.R.S.," and set up by him several years since "for that curious Gentleman, Mr. BALLE, at Cambden House, which succeeded so well . . . and with the Improvements which I have since made to it, I am apt to believe will be less subject to be out of Order, than any Engine whatever." BRADLEY prints a long letter (dealing with the variations of colours in the leaves and flowers of trees and plants) from ALEXANDER STUART, dated London, May 9, 1717, in which the latter writes "Your ingenious Conversation, join'd with the delights of Mr. BALLE's curious Garden at Cambden House, made such an Impression t'other day," etc. In a letter dated May 6, 1718, his friendly rival author the Rev. J. LAWRENCE opens with "I suppose by this time you have returned to Cambden House out of the West." † BRADLEY dedicates his Gentleman and Gardeners Kalendar, 1718, to "ROBERT BALLE,

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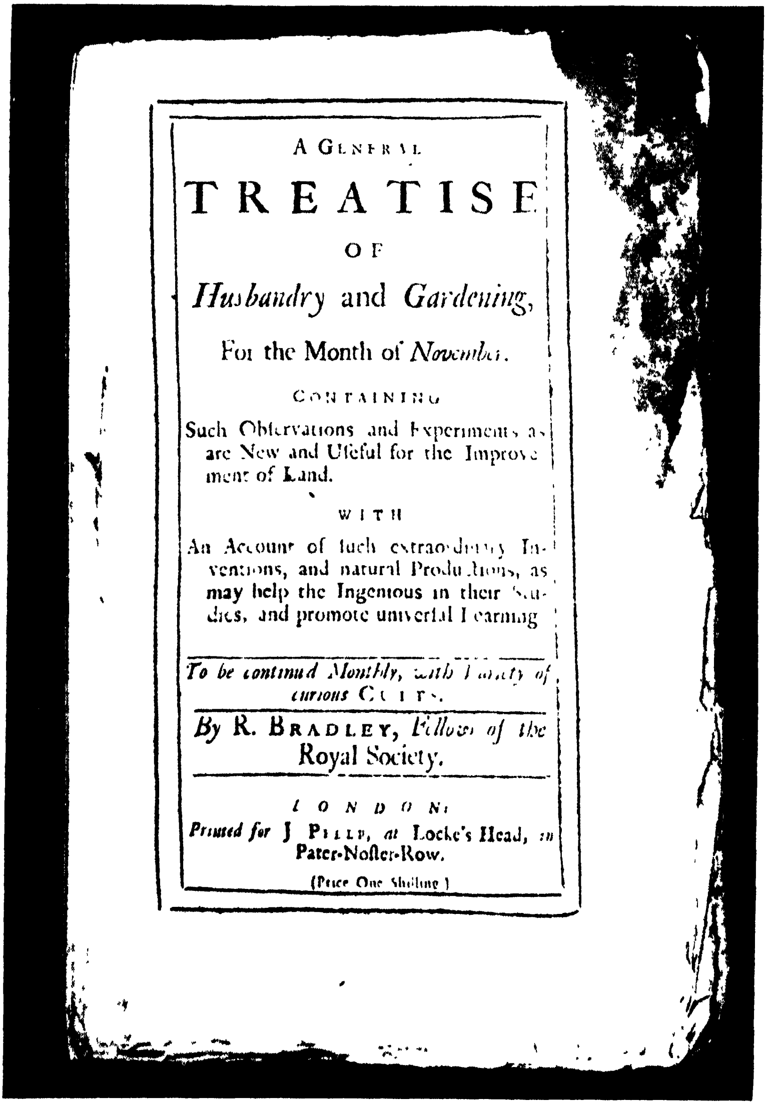
* The Assistant Secretary of the Royal Society has been good enough to tell me that ROBERT BALLE was proposed, balloted for and chosen a member of the Society on November 30, 1708, and that on May 4, 1709, he was formally admitted and signed the Charter Book. His name continued in the List of Fellows till 1731, but not later; so it may be assumed that he died at about this time.

† This reference to a visit to the West is probably that to THOMAS BALLE, Esqr., at Mamhead in Devon, mentioned in the April number of his General Treatise, pp. 29–33. This old family, to which doubtless ROBERT BALLE belonged, became extinct about 1750.



A GENERAL

TREATISE

OF

Husbandry and *Gardening*,

For the Month of *November*.

CONTAINING

Such Obſervations and Experiments as are New and Uſeful for the Improvement of Land.

WITH

An Account of ſuch extraordinary Inventions, and natural Productions, as may help the Ingenious in their Studies, and promote univerſal Learning.

To be continued Monthly, with Variety of curious CUTS.

By R. BRADLEY, *Fellow of the* Royal Society.

LONDON:

Printed for J. PEELE, *at* Locke's Head, *in* Pater-Noſter-Row.

(Price One Shilling.)

FIG 25 REPRODUCTION OF COVER OF ORIGINAL ISSUE OF BRADLEY'S TREATISE
Size 8¼ × 4½ in

[*To face p.* 172.

Fig. 26.—Primulas in the late Mr. Stewart Sandeman's Garden

of Camden House, Esqr.," and explains that his reason for so doing was that it "contains many Observations and Experiments which have been made in your Curious Gardens at Cambden House." It is not easy to construct a very convincing theory from these few fragments; but to me they suggest that the Gardens at Campden House were under the direction of BRADLEY when the place was tenanted by his friend ROBERT BALLE, who was among the subscribers to his Philosophical Account, 1721.

BRADLEY, for those days, was a much travelled man. At home we may trace him from Devonshire to the Midlands; abroad he was familiar with the gardens in Paris and the vicinity, and of those in the Low Countries, particularly at Amsterdam, where in 1714 he must have stayed for a considerable time—the Botanic Garden there, he tells us, "exceeds all others." He not only travelled but he must have taken copious notes of the things he saw and heard. "Among the many I have conversed with of all Nations and all Degrees," he says in one of his papers; and he had the true journalistic flair of extracting information from the most unpromising persons. It is only just to say that he was fair in his acknowledgments, which is not a universal journalistic virtue. He was evidently a frequent and welcome visitor to the nurseries and market gardens as well as private establishments around London, from Hoxton and Stoke Newington to Fulham, Richmond and other parts; apart from these he must have had a large circle of correspondents. In the first six numbers of his General Treatise there are over sixty persons mentioned by name from whose gardens or letters he had received help—and FAIRCHILD of Hoxton tops the lot, for he is referred to over twenty times. All this must have been good for trade, and certainly helped to promote gardening.

He was also an artist of sorts, and may have made the rough sketches of some of the many plates in his books. Of an old Roman pavement found at Woodchester, Gloucester, the Comte de CAYLUS engraved a portion in his "Recueil d'Antiquités," Paris, 1756, "from an incorrect drawing by one R. BRADLEY, executed about the year 1722." BRADLEY refers to this pavement as found "by my worthy Friend EDMOND BROWNE, Esqr." in his Monthly Register for June and July 1722, p. 75. We have another gleam of BRADLEY's art in The Grub Street Journal of July 2, 1730: "The learned author of the Greenian Philosophy, has obliged the public with a curious print of Clare Hall, drawn by the hand of Mr. Professor BRADLEY. There are two new things in this picture. Mr. BRADLEY is created M.D., and the sun is placed in the north."

BRADLEY tells us in one place that he has "had a Natural Bent of Genius even from my Childhood" for gardening and planting; and in another (1724), "I can never abandon the study of Planting and Gardening, as Things that contribute to every Man's private Good, as well as the good of my country." But in thanking "those curious gentlemen" who had assisted him in the work, there is a distinct tone of disappointment. The world would, he hopes, excuse him if he boasts a little of his success, "since some complements upon it [his work] have been the chief Reward I have met with, for all my great Expence and Labour."

BRADLEY was not a great botanist or a great gardener, or a great author, for he dabbled in too many things to excel in any one of them. But he occupies a very distinct and important place in the history of gardening and husbandry in the first quarter of the eighteenth century. It was a transition period. Authors of the period, as BRADLEY himself points out, copied from their predecessors "without the least acknowledgment of their thefts or adding one single improvement to the knowledge of their forefathers," and "jogged on in the old beaten track." BRADLEY had a passion for experimenting, and his infectious enthusiasm and his freedom in imparting information undoubtedly contributed greatly to the advancement of gardening in England. He was often a prophet without much honour in his own land, and as with most pioneers he sowed where others reaped. It is unfortunate that there is no known portrait of this Father of Horticultural journalism; but he has left us a legacy of writings, which if often diffuse, are as a whole of great historical value in the history of gardening.

COLOUR IN ROCK AND WOODLAND GARDENS.

By R. E. HAY.

[Read February 7, 1939; Viscountess BYNG OF VIMY in the Chair.]

IT seems to be the fashion nowadays to begin a lecture with an apology, and I feel that I should at least explain that if you have come this afternoon in the hope of hearing a comprehensive survey of colourful plants for the rock and woodland garden, together with cultural directions for providing a display throughout the year—even if that were possible—then you have been brought here under false pretences. But, if you will find pleasure in looking at some colour photographs of some of the rock and woodland plants that I have been privileged to see and photograph in gardens in Scotland and nearer home at Lady BYNG's garden at Thorpe-le-Soken, at Kew, and at Wisley, then I hope you will not consider your afternoon wasted.

I would like to mention that the plants you will see on the screen have all been photographed in the gardens where they have grown and flowered; there are no "specimen" or pot-grown plants. In some instances the conditions they have enjoyed have been as nearly ideal as it is possible to find in Great Britain. In others, the conditions are such that anyone here could grow them.

I would like to express my great gratitude to the owners of the gardens who have allowed me—I might almost say encouraged me—to photograph their treasures, and among those ladies and gentlemen, I would like to thank our Chairman, Lady BYNG, for her great kindness to me at Thorpe Hall. Other garden owners to whom I owe a great debt are Mr. ANDREW HARLEY of Dollar, Mr. EUAN COX, and Mr. and Mrs. JOHN RENTON of Perth, whose small garden is the source of endless pleasure, and whose keenness and knowledge of plants is simply amazing. And I must make a special reference to a unique garden in Scotland and to the maker of that garden who is now no longer with us. I mean the late Mr. STEWART SANDEMAN and his wonderful garden at The Laws in the county of Angus, near Dundee. You have no doubt all heard or read of that garden, which was the great joy of Mr. SANDEMAN's later years, and in the planting and making of which he was greatly helped by Mrs. SANDEMAN. It is happily situated in one of the most favourable parts of Scotland for growing to perfection many plants which are difficult or sometimes impossible to grow elsewhere. Primulas of all kinds flourish there among the cool leafy woods, and some even seed themselves and hybridize with each other, coming up spontaneously everywhere.

During June of last year, Mr. GOULD of Wisley and I made a short tour of some of these gardens, and I want you to try to imagine a rather dull, overcast day, when the clouds hung low in the sky after a steady drizzle of rain. Picture a wooded drive winding along until the trees open out and a stone-flagged path leads away between banks of Rhododendrons and hardy ferns with great drifts of Primulas stretching away into the distance on either side of a narrow stream. In this great concourse of Primulas at The Laws (fig. 26) are included *Primula* 'Red Hugh,' *P. japonica*, *P. Bulleyana*, *P. Beesiana*, and their forms, *P. pulverulenta* and the pale Bartley shades, *P. nutans*, *P. Cockburniana*,and many others. Primulas are also a feature of Mr. Cox's garden at Glendoick, and there *P.* 'Inverleith' (*P. Bulleyana* × *P. pulverulenta*), a hybrid of *P. glycyosma* and also a hybrid between *P. aurantiaca* and *P. Cockburniana*, are outstanding.

Meconopses (fig. 27), of course, are indispensable for the lightly shaded woodland garden. A very old plant of *Meconopsis regia* (fig. 28) in Mr. HARLEY's garden gives a good indication of the plant's possibilities, and the new Sherriff form of *M. violacea* grown by Mr. Cox gives this species an added value, as the flowers are of a brilliant blue. Beautiful as the Meconopsis is in its flowering stage, there are many gardeners who are of the opinion that plants which have such beautiful foliage in their winter state have no need to produce flowers to earn a place in the garden. And no one can look unmoved at the exquisite beauty of some of the members of the Robustae group in their winter state. Take, for instance, *M. regia*, with its long, silken, silvery leaves set in their impeccable rosette, or *M. Dhwojii* (fig. 29), with its hairy, finely divided leaves, before they begin to show that peculiar, reddish tinge at the hair base that is seen in almost every plant of this delicately beautiful species. *M. paniculata*, too, in its silver-leaved form is a masterpiece of delicate beauty, just as hairy, but more silky in texture, and giving a softer effect to the plant. And then there is the golden form which so often appears; it is neater altogether. Extremely fascinating it is to examine a good batch of various Meconopses say in early March, when they have formed their rosettes, and almost every plant differs in some manner from its neighbour.

We have progressed a little in our knowledge of growing Nomocharis, but even so, Mr. HARLEY seems to have won an understanding of their needs and temperament that has evaded most other gardeners. Mr. HARLEY seems to find them quite easy to grow, and claims no special treatment or method for raising them other than those usually employed for raising Lilies from seeds. He grows at least six distinct Nomocharis, including varieties and hybrids, in narrow beds in semi-shade. *Nomocharis Mairei*, *N. pardanthina*, *N. saluenensis*, and *N. aperta* all grow here together in delicate harmony with each other.

Turning to less exalted woodland plants, but in their way none the less beautiful, there are the Hostas (Funkia), notably the species that flourishes so well at Wisley—*Hosta Sieboldii*. Wisley provides us too with fine drifts of *Campanula latifolia*, both in its blue and white forms, and not far away in the same stretch of wood, and flowering at the same

FIG 27 — MECONOPSIS BETONICIFOLIA 7-YEAR-OLD PLANTS IN MR EUAN COX'S GARDEN

To face p 170

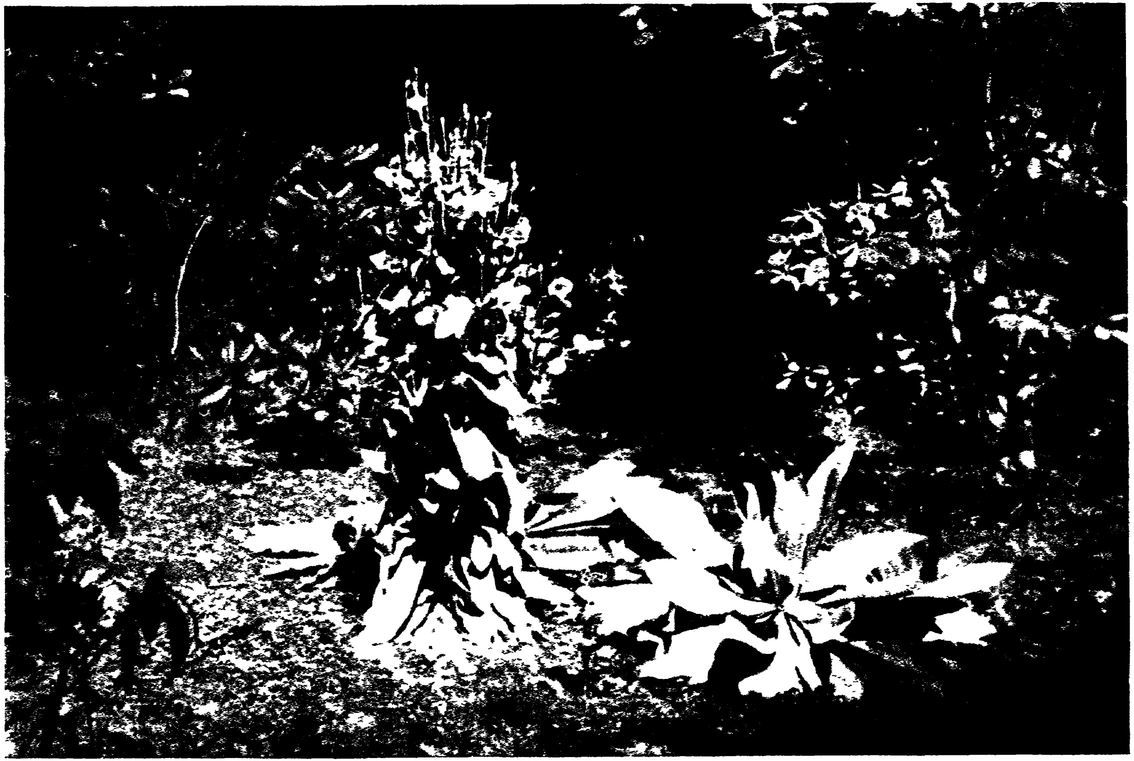


Fig. 28 Meconopsis regia

time, we find the New Zealand Flax, *Phormium tenax*, with its blood-red inflorescences, and *Lilium Szovitsianum*. Of Lilies, I can only mention just those most commonly found—*L. tigrinum splendens*; its richly spotted flowers are always the source of much admiration in that delightful corner of the Duke of CAMBRIDGE's garden at Kew, where so many Lilies grow lustily every year. There, too, one can find in late summer *L. speciosum rubrum*, and many others.

There are few more tantalizing plants to grow than *Tropaeolum speciosum*, and no doubt most gardeners have tried it at some time. One can almost expect to hear a different tip for growing it successfully in every garden in which it is to be found. There is no doubt that moisture in the atmosphere is much appreciated by this brilliant climber, and lack of this necessity is one of the reasons why it fails to flourish in many southern gardens.

If the rock garden is of sufficient size, there is no doubt that *Geranium anemonifolium* is one of the most attractive and valuable plants that can be used for making a transition from a natural woodland surround into the rather more precise and neat rock garden itself. That is how it is used with great effect at Thorpe Hall, and even when flowering is over, and this is a prolonged delight, the graceful delicacy of the foliage is in itself a pleasure.

One of the most delightful settings for alpine plants is the natural glen which Mr. EUAN COX has planted at Glendoick, where the stream is margined with Irises and Primulas, and many other choice and rare alpines. In the middle of the stream stands a huge specimen of *Primula Florindae*, with its roots constantly washed by the running water. It is almost incredible the amount of water that this Primula will endure. Halfway up the glen is a splendid group of *Viola bosniaca alba*, a strong-growing, robust form, neighboured by *Primula* 'Inverleith.'

And now I think we are going to make history, for I believe I am right in saying that no photograph of a cultivated Cremanthodium has ever appeared on this screen. At any rate, if this statement is too sweeping, I think it is safe to say that this is the first coloured photograph of *Cremanthodium Sherriffii* which has been shown in this hall. It is a curious and attractive species with hairy, red stems and undersides of the leaves, and the flower is white and sweetly scented. It was just opening when we visited Mr. RENTON's garden in June, and it also flowered last year at the Edinburgh Botanic Gardens. It was discovered by SHERRIFF in 1936 in Southern Tibet, and distributed under his number 2040.

Of Gentians my choice of slides is very limited. I would like to have shown *Gentiana ornata* and many others, but I have only *G. lagodechiana* and *G. saxosa*, the white species from New Zealand.

Among the dwarfer Lilies suitable for smaller rock gardens, there is the beautiful *Lilium tenuifolium*, and a few good stems of this Lily, offset by a fine piece of rock, present one of the loveliest sights imaginable.

Lewisias, too, must figure in every rock garden, large or small, and probably *Lewisia Howellii* is the best to start with. Mr. HARLEY'S magnificent plant of it is almost legendary in Scotland now.

Calceolaria bicolor and *Phlox argillacea*, that gem of the genus from North America, are also plants of merit for the rock garden. *P. argillacea* is also suitable for the herbaceous border, and will, no doubt, become highly popular when better known. *Incarvillea grandiflora*, that deep carmine species, and the yellow *Roscoea cautleoides* are two more adaptable plants for either the rock garden or the border.

The huge, fascinating rock garden at The Laws, much of it actually dug out of the solid rock, contains many treasures, and the large plants of *Alyssum spinosum* and *Veronica Lyallii* are both noteworthy specimens of noteworthy plants.

The tiny *Digitalis dubia*, with its dainty, rosy pink flowers, lends a note of distinction to a sheltered pocket in Lady BYNG'S rock garden, and the steps leading down to it are covered almost completely with *Thymus Serpyllum albus*, leaving only a small space between the close mats of flowers to tread upon. In association with the Thyme is the scarlet *Verbena chamaedrifolia*, which, in years gone by, was grown in standard form 5 feet high as a bedding plant.

Happy associations of plants are always to be aimed at, and *Campanula pulla*, *Sedum caeruleum* and *Papaver alpinum* make a beautiful combination. One of the most charming parts of the Wisley rock garden last year was a large pocket filled with *Lychnis Arkwrightii*, *Orchis foliosa*, and the tiny *Astilbe crispa* hybrids 'Kobald' and 'Lilliput.' Immediately behind this choice little group, hundreds of inquisitive faces of *Viola* 'Jackanapes,' the true, small-flowered form, looked down from a higher pocket.

Linaria origanifolia provides a gay show of flowers in late summer, and another late-flowering plant of great value is the comparatively new *Cyananthus integer*, which appears to have the great merit of being fairly easy to grow and to keep, besides being free-flowering and of a really good blue shade.

The dwarf Dianthuses lend bold patches of colour to the rock garden, and *Dianthus caesius* as grown at The Laws (fig. 30) may claim to rank among the very best of the dwarf Pinks.

The choice of suitable plants for surrounding the rock garden is as important as the choice of its occupants and the grouping of them. *Lilium regale*, with plants of *Lupinus nootkatensis*, caught with a background of dark conifers, leaves no doubt about the type of shrub that makes the most beautiful setting for the rock garden.

So much for true alpine plants, or as many of them as time has permitted us to consider. There are many permissible interlopers in any rock garden—the dwarf annuals and the waterside plants, and also Cacti and succulent plants. Purists among alpine gardeners may view such invasions with dismay, but used skilfully, and with restraint, they are most effective. There is no gardener who experiments more boldly or successfully with these "aliens" than Lady Byng. She has at Thorpe Hall a Cactus Corner, whose inmates are covered in winter with Windolite, but in summer are both unusual and very attractive. Mammillarias, Echeverias, Mesembryanthemums, and similar plants flourish in this way, and lend an intriguing novelty to the garden. Annuals are Lady Byng's special pleasure, and *Anagallis collina*, *Layia elegans*, the old-fashioned Tidy Tips, *Lupinus nanus*, *Cotula barbata* and other suitable annuals help to prolong the display in late summer.

The use of water in the rock garden obviously adds greatly to its beauty, and increases the number of plants that may be grown. At Thorpe Hall, Mimuluses of all kinds, *Primula Florindae*, and that curious and quite attractive plant *Houttuynia cordata* flourish happily by the slowly moving stream.

These plants are but a few of the many lovely subjects available to the fortunate gardener with a rock or woodland garden. That they just skim the surface of these treasures, I know only too well, but among them are some of the easiest and some of the most difficult plants to grow in this climate of ours.

HARDY FRUIT IN THE COMMERCIAL FRUIT TRIALS, ROYAL HORTICULTURAL SOCIETY'S GARDENS, WISLEY.

THE trials of varieties of hardy fruits for commercial purposes at Wisley occupy with the sixteen acres of varieties planted for purposes of comparison about thirty-nine acres.

The arrangements of these trials, which are under the direction of a Joint Committee of the Ministry of Agriculture and the Royal Horticultural Society, and the method by which new varieties are recruited have been fully described in this JOURNAL (vol. 48, p. 65) and, as already pointed out, the most promising varieties are propagated and distributed to sub-stations in various parts of the country.

In 1937 the following were selected by the Judging Committee for propagation and distribution to the sub-stations for extended trial:

Apples.—' Epicure,' ' Patricia,' and two seedlings (Nos. 920 and 180) from the John Innes Horticultural Institute, while it was arranged to propagate ' Fortune,' ' Gloucester Cross ' and ' Woolbrook Pippin ' in preparation for distribution in the near future if their present promise was maintained.

The following new fruits have been accepted for trial:

Apples.—' Sussex Pippin,' a late keeping culinary variety similar to ' Annie Elizabeth,' from Mr. F. Streeter, Petworth Park, Petworth, Sussex.

Seedling No. 925, a late dessert Apple, raised by the John Innes Horticultural Institute, Mostyn Road, Merton Park, S.W. 19.

Cherry.—Seedling Cherry, from Mr. C. J. Howlett, The Yews, Earley, Reading.

The following fruits have also been received for adding to the standard collections:

Strawberries.—' Aromatic,' ' Cambridge Early,' ' Improved Sir Joseph Paxton,' and a Seedling.

Raspberries.—' Burnetholm Seedling,' ' Doncaster,' ' Harraway's Seedling,' Seedling 15/31, ' Todd's Cardinal.'

Plums.—' Blaisdon Red,' ' Jubilee,' ' Lutzel Sacher fruh Swetser,' ' Olympia,' ' Ruth Gerstetter.'

Apples.—' Camelot,' ' Duck's Bill,' ' Pioneer,' ' Zigeunerin.'

Pears.—' Abas Beki,' ' Dyhir Nadri,' ' Espiki,' ' Kokhmasy,' ' Kuirduki,' ' Kyrmyzy Naramud,' ' Nar Armud,' ' Nargilia,' ' Nurum Burum,' ' Shaftali Armud,' ' Shemakha Sakhry,' ' Sini Armud,' ' Tany Kisil.'

APPLES.

The cropping of most fruits on trial, with the exception of Black Currants and Plums, was generally satisfactory in 1937 and several new Apples attracted considerable attention during the season. Among these were the dessert varieties, notes upon which follow.

FIG 29 — MECONOPSIS DHWOJII IN MR RENTON'S GARDEN

Facing p. 180

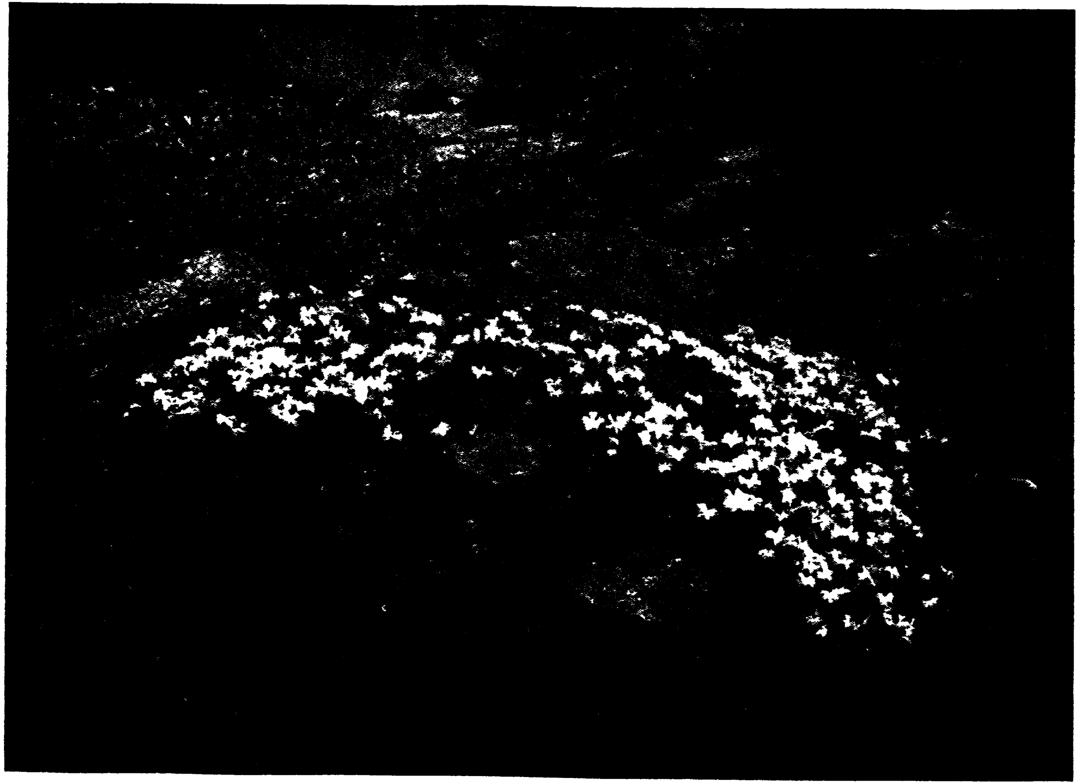


FIG 30.—DIANTHUS CAESIUS IN THE LATE MR STEWART SANDEMAN'S GARDEN.

Fig 31 —Apple ‘Lord Lambourne’ at Wisley

FIG. 32. APPLE 'CRIMSON COX' AT WISLEY

[*To face p.* 181.

'Epicure' (early September), raised by Messrs. Laxton. A heavy cropping flat round Apple, well coloured and of fair flavour coming into bearing on Type XII at an early age.

'Exquisite' (late September-October), raised by Messrs. Laxton. A conical highly coloured variety, of good flavour, but an inconsistent cropper.

'Taunton Cross' (September-October), raised at Long Ashton. This variety cropped heavily for the first time in the trials. Fruit medium, regular, brightly flushed and streaked with red, and of moderate flavour.

'Fortune' (September-October), raised by Messrs. Laxton. Carried a light crop on the young trees recently established. Fruit regular, round, a little oblong, lightly flushed red with similar colour stripes. Texture rather soft; flesh with a slight Banana-like flavour.

'Patricia' (September-October). A Canadian variety which has proved to be a prolific cropper, and appears to have a longer season than 'Worcester Pearmain.' The fruit is regular, round, conical, rather small, covered with a bright red flush. Flesh white, firm, juicy, and sweet.

'Gloucester Cross' (October). A short-seasoned Apple raised at Long Ashton, which cropped heavily for the first time. The rather small fruit is round to conical, attractively flushed and striped with red, but the good flavour it possesses when picked from the tree does not last for any length of time.

'Lobo' (September-October) is another heavy cropping Canadian variety, but the medium round, flat, bright red fruits on the tree turn an unattractive dark crimson after picking.

'Red-Coat Grieve' (October) again proved at Wisley a better cropper than its parent 'James Grieve.'

'Millicent Barnes' (October-November). The behaviour of this variety has already been reported (R.H.S. Journal, **62**, 298) and while it continues to attract attention because of its consistency of cropping the crop is usually not heavy.

'Thorpe's Peach' (October-November) continues to crop well, but the fruit is too large for a commercial dessert Apple.

'Lord Lambourne' (September-October), raised by Messrs. Laxton, is now becoming well known and is being planted to precede 'Cox's Orange Pippin' in season of marketing (fig. 31).

'Opalescent' (October-November). Of American origin. This variety attracted attention by the pleasant sight which the very large beautifully coloured fruits presented when hanging on the tree. The flavour is poor. While a little scab was observed on the foliage of this variety, none was apparent on the fruit, the skin of which is extremely sticky.

'Crimson Cox.' A coloured sport from 'Cox's Orange Pippin,' similar in shape and in season at the same time. The flavour does not appear to be as good as the parent, and the skin is tough (fig. 32).

'Sunset' (November-December). A medium-sized golden-yellow Apple flushed with red and speckled with russet. Size regular, shape round, rather flat. The yellowish flesh is of good texture but becomes rather soft on keeping. Flavour good. Requires further test.

'BOWDEN'S SEEDLING' (November-December ?), reputed to be raised from crossing 'Cox's Orange Pippin' and 'Cornish Aromatic,' is difficult to distinguish from 'Jonathan' except that the fruit appears to be more regular in shape and size than that of the latter variety. Flesh white, sweet and juicy. Cropped heavily in 1937.

'WOOLBROOK PIPPIN' (December-January). Not unlike 'Allington Pippin' in appearance, but not so conical. Flesh creamy-white, sweet, and of fair flavour. Has cropped heavily over a period of years, and may be a useful variety where 'Cox's Orange Pippin' fails.

'SUPERB' (November-February), raised by Messrs. Laxton, now widely planted commercially, does not require further description. Continues to be a consistent cropper.

'WINTER KING' (January-April), raised by crossing 'Cox's Orange Pippin' and 'Worcester Pearmain.' The fruit is medium round to conical, practically covered with a deep red flush and stripes. Flesh is very firm, crisp, sweet and juicy. The two trees first planted for observation cropped heavily and attracted considerable attention.

'GRANNY SMITH.' This well-known Australian Apple cropped for the first time in the trials and created a good deal of interest. The fruit is similar to that imported from Australia, except that a slight brown flush occasionally appears on the side exposed to the sun.

Of culinary varieties 'ARTHUR TURNER' (August-October) was described in the R.H.S. JOURNAL, **62**, p. 299, and it enhanced its early promise as a variety to replace 'Grenadier' and in early districts 'Early Victoria.'

'SOWMAN'S SEEDLING' (September) has cropped heavily since becoming established in the trials, but the promise shown in earlier years has been lessened by its susceptibility to Bitter Pit.

'HOWGATE WONDER' (October-December) again cropped heavily. The fruit is large, regular, round, slightly flattened. Colour green, striped with red. The fruits harvested in 1937 did not keep well, but this may have been seasonal combined with the fact that they were taken from young trees.

'A. W. BARNES' (October-January). The fruit of this variety is similar in size to 'Lane's Prince Albert,' but is more regular in shape and more highly coloured, being practically covered with a red flush and stripes. It has cropped regularly over a period of years and possesses good cooking qualities.

'MONARCH' (December-March). The performance of this variety has already been reported, and it is now widely planted commercially. From the sub-station at Worcester it is reported that while this variety crops well, a satisfactory local market cannot be found and preference is given to the standard variety 'Bramley's Seedling.'

'CRAWLEY BEAUTY' (December-March), has again cropped heavily, but the fruit continues to be on the small side for commercial purposes.

'EDWARD VII' (December-April). This variety is a comparatively old one, but it attracted considerable attention in the trials this year. The green fruit is medium and uniform in size and has excellent keeping and cooking qualities.

PLUMS.

At the flowering period the Plum crop promised to be good, but the set was the poorest for years and few varieties carried an average crop. The bad set may be attributed to the cold weather experienced during the flowering period as there was an absence of insect life at this time. No Humble Bee was observed during March and April, an insect on which we rely largely for Plum pollination. The Humble Bee usually hibernates in hedge banks, often on those of ditches, and its absence is possibly due to large numbers having been drowned when the ditches overflowed during the wet winter.

Amongst the varieties which cropped this year were several of the newer introductions:

'BLACK PRINCE.' This was raised by Messrs. Laxton by crossing 'Black Diamond' and Damson 'Bradley's King' and comes into season just before 'Czar.' The fruit is medium, round, rather oval. Skin deep blue covered by a white bloom. Flesh golden-yellow, juicy, sharply acid, cooking excellently.

'BOUNTIFUL.' Reports on the behaviour of this Plum have already been made. It still continues to crop heavily, but the quality is only fair. The season is about ten days before 'Victoria,' when there is no other red variety available.

'DELICIOUS.' This Plum confirmed its early promise by producing a good crop. The season is early to mid-September; fruit similar in shape to 'Coe's Golden Drop' and slightly larger. Skin an attractive bright red covered by a bluish bloom. Flesh golden-yellow, of good texture, very sweet and of rich flavour.

'MARJORIE'S SEEDLING' (fig. 34) attracted considerable attention on account of its lateness, and again cropped heavily. It therefore appears to bear out the statement in the R.H.S. JOURNAL, **62**, p. 300, that it would become a consistent bearer once it had settled down. It is an extremely vigorous grower and consequently has taken some time to yield fruit. The fruits begin to ripen at the end of September and hang well into October. It is a dual purpose variety with large oval deep purple fruits covered by blue bloom. Flesh yellow, firm, juicy, sweet, but not sufficiently acid to make it a first-class cooking variety. Observations this year again showed no marked susceptibility in this variety to Bacterial Canker. (The stock of 'Marjorie's Seedling' has now been acquired by Mr. C. H. Sykes, Bricklehampton, near Pershore.)

Other varieties in the collection which cropped well were: 'Coate's French Prune,' 'Czar,' 'Giant Prune,' 'Langley Bullace,' 'Pacific,' 'Stanleot,' 'Sugar,' and 'Victoria.' 'Merryweather' remains the most satisfactory Damson.

PEARS.

Two comparatively new Pears to crop freely were 'Laxton's Superb' and 'Beurré Bedford.' The former is in season at the end of August and the beginning of September, and possesses qualities which have already recommended it for commercial planting. 'Beurré Bedford' is a heavy cropper, but there are existing commercial varieties of similar type and season with a much better flavour.

STRAWBERRIES.

The general habit and cropping power of Strawberries on trial cannot be commented on this season, as efforts have been directed towards obtaining a healthy and vigorous stock of each variety. This has been achieved with most varieties and healthy stocks have now been established which should crop satisfactorily next year.

It is of interest to record that the variety 'Brenda Gautrey' (syns. 'Huxley Giant,' 'Evesham Wonder,' 'Chip-filler,' 'Ettersburg 80') does not show the characteristic symptoms of Yellow Edge, but gradually deteriorates through a general dwarfing of the plant—the foliage remaining quite green.

RASPBERRIES.

The outstanding new Raspberries this year were the American varieties 'Taylor' (fig. 35) and 'Newburgh.' Both are vigorous growers. The foliage and general habit of 'Taylor' show its relationship to 'Lloyd George,' and susceptibility to Mosaic. The trusses are large, bearing large, conical, little flattened, rather dark red fruits, which are easily plugged. The flavour is sub-acid, somewhat watery, with nothing in particular to recommend it.

The foliage of 'Newburgh' (fig. 36) gives the impression of a very robust nature, and is of a type which could be associated with resistance to disease. The fruiting season is long, the first fruits ripening mid-season and continuing until quite late. The trusses are large, held well out, bearing large round, firm, bright red to crimson fruits which are easily plugged. Flavour is very sweet with a trace of acid, making it of good quality.

The behaviour of the new 'Mayfair' was not so satisfactory as last year—the fruiting canes being short. Further test of this variety is necessary and it is hoped that as the stock is being re-selected it will exhibit more vigour.

The behaviour of varieties, reports on which have been previously published, may be summarized as follows:

The previous wet winter seemed to have suited 'Baumforth A' and 'B,' 'Bountiful,' 'Lynn's Superb,' 'Red Antwerp,' 'Renown,' and 'Reward,' as they all gave a good yield. 'Epicure' produced one of the heaviest crops in the trial, but the good flavour of this variety was not so pronounced as usual.

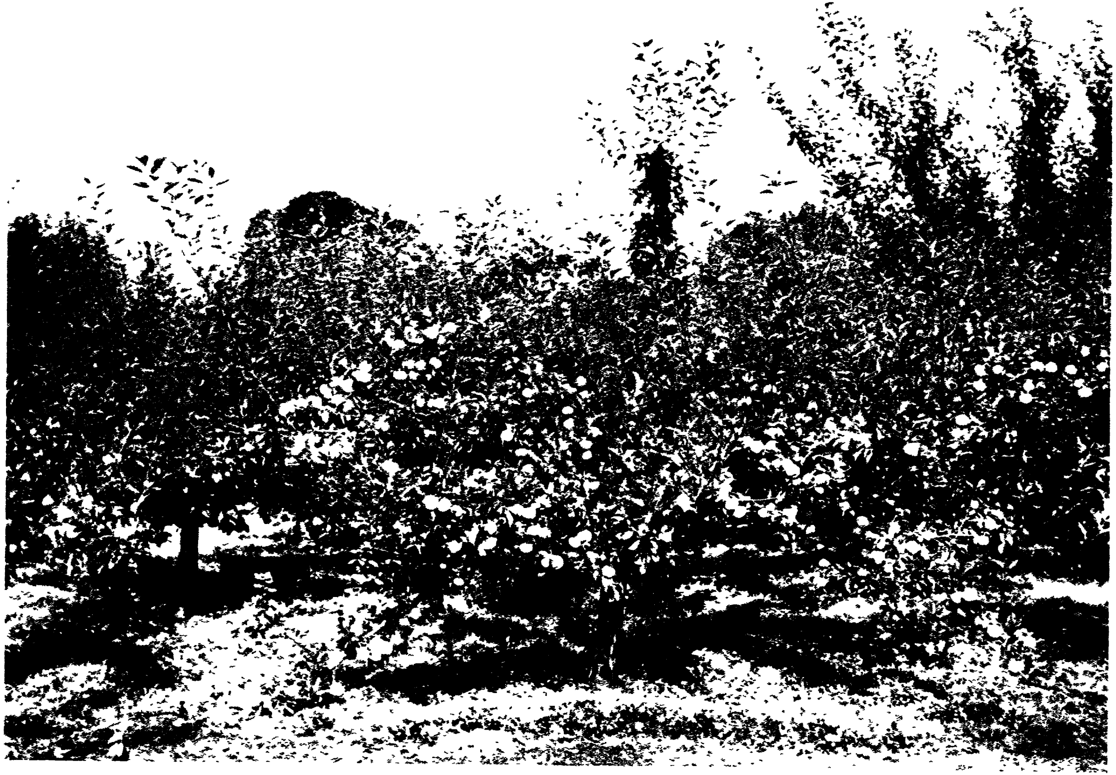


Fig 33 - Apple 'Cox's Orange Pippin' at Wisley

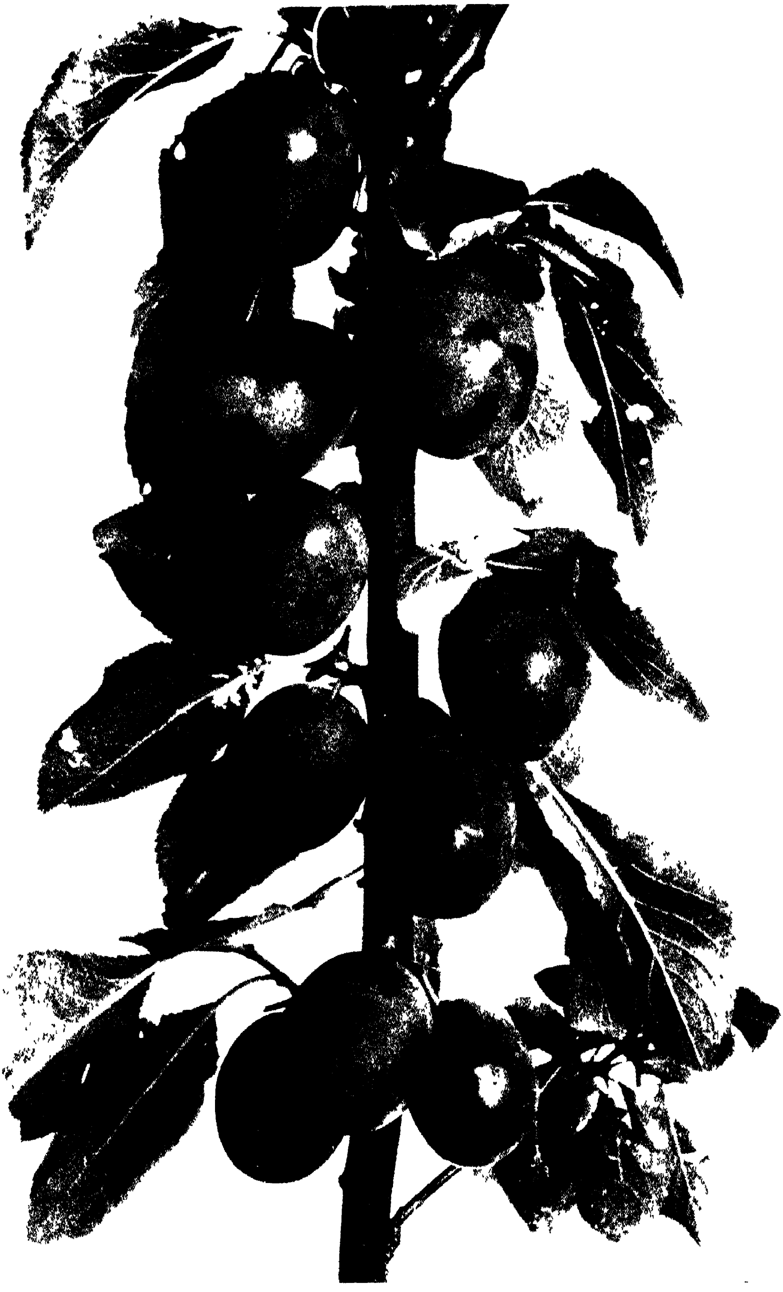


FIG. 34.—PLUM 'MARJORIE'S SEEDLING'

[*To face p.* 185.

Difficulty has been experienced in maintaining a satisfactory healthy stock of 'Lloyd George,' and 'Pyne's Royal' again emphasized that it does not thrive on a light soil. It is interesting to note that while 'Red Cross' is affected by Mosaic the disease does not reduce the vigour of this variety to the same extent as other varieties attacked, and the canes continue to produce a satisfactory crop.

'Duke of Cornwall,' which was one of the outstanding varieties in 1936, was not nearly as good this season. The flavour of the berries was poor, giving the impression that a dry season suits this variety best. The same may be said of 'Brocket Hall.' While this variety produced a yield comparable with any other variety in the trials, the yield was not so heavy as that of the previous year when there was less rain.

The 'Allenberry' yielded good fruit the softness of which makes it unsuitable for commercial planting, but the good flavour possessed would make it a useful variety for private use.

No late variety has been received for trial which is likely to supersede 'Norfolk Giant.' This variety is maintaining its vigour and continues to give satisfaction.

GOOSEBERRIES.

The young bushes of the Gooseberries on trial cropped satisfactorily. The three varieties undergoing trial are:

'GREEN GEM,' dual purpose, moderately large, round to oval, well shouldered. Colour green with pale green veins. Flesh dark green and fair flavour. Mid-season, habit good, little spreading, has proved to be a consistent and heavy cropper and useful for picking green. Not recommended for canning owing to the colour being too green.

'BEDFORD RED,' dual purpose, medium round. Colour dark dull red. Skin with short stiff erect hairs. Flavour good. Mid-season. Habit good, upright, quite good for picking green and cropping satisfactorily. Good for canning.

'INGALL'S PROLIFIC RED,' dessert, large, oblong, well shouldered, tapering to stem. Colour pale red. Skin little downy. Flavour good. Season rather late. Habit spreading. A moderately good cropper, and suitable for canning.

'Bedford Red' and 'Green Gem' yielded a greater weight on an average than any of the standard varieties.

Varieties which gave a good performance in the established collection were 'Beauty,' 'Bollin Hall,' 'Crown Bob,' 'Dr. Wortley,' 'Fascination,' 'Forester,' 'Hedgehog,' 'Highlander,' 'Lord Derby,' 'Major Hibbert,'' Ocean,' 'Rifleman,' 'Sir G. Brown,' and 'Thatcher.'

RED CURRANTS.

There has been no new variety introduced for some years, and 'Laxton's No. 1' and 'Earliest of Fourlands' remain the outstanding varieties. Both ripen early within a few days of each other. Two mid-season varieties which gave notable performances were 'Osborne's Red' and 'Wilson's Long Bunch' (Allgrove). These were followed in season by 'Halle's Long Bunch Red' and 'Rivers' Late Red,' attracting attention as late varieties.

BLACK CURRANTS.

Bad setting conditions prevailed in 1937 while the Black Currants were in flower and the yield was very light. Therefore the weight obtained from the newer varieties cannot be accepted as an average crop weight owing to the unfavourable season.

A new variety which showed some promise was 'Mendip Cross.' It is somewhat similar to 'Boskoop,' and from the few fruits harvested appears to ripen a few days earlier than the latter variety. Further test is necessary.

Amongst the comparatively recent introductions those which appeared the best were 'Westwick Choice,' 'Wellington XXX,' 'Nigger,' 'Invincible Giant Prolific,' 'Supreme,' and 'Raven.'

Varieties in the collection which received attention on account of the greater quantity of fruit they carried in comparison with other varieties were 'Edina,' 'Orr's Seedling,' 'Hawkins' Excelsior,' 'Climax' and 'Hatton Black.'

BERRIES.

The three outstanding berries remain 'Bedford Giant' (early), 'Himalayan Giant' (mid-season), 'John Innes' (late); they continue to give satisfaction. The new 'Clandon Seedling' has yet to crop, and so has the 'Bosenberry,' which is reputed to be an improved 'Youngberry.'

SULPHUR-SHY VARIETIES OF APPLES.

The normal lime-sulphur spraying of Apples at Wisley is as follows: 1 in 30 green bud stage, 1 in 60 pink bud stage, 1 in 100 post blossom, and the wash applied at these strengths has been found to damage the undermentioned list of Apples in that their foliage dropped. The order of the varieties in the list shows their comparative susceptibility to sulphur damage.

'St. Cecilia'
'John Apple'
'Stirling Castle'
'Lane's Prince Albert'

If post-blossom spray applied practically complete defoliation results. Therefore no post-blossom spray applied.

'Ball's Pippin.'
'Carlisle Codlin.'
'Frogmore Prolific.'
'Ringer.'
'Premier.'
'Victory.'
'Beauty of Bath.'

SYNONYMS.

It sometimes happens that varieties are received for trial, or for planting in the standard collections, under names which are synonyms of existing varieties. As far as can be determined the following Apples are apparently the same:

ESTABLISHED NAME.		RECEIVED AS
'King's Acre Pippin'	=	'Ribston Pearmain.'
'Cellini'	=	'Norfolk Challenger.'
'Lane's Prince Albert'	=	'Profit' and 'Perkins' A1.'
'Annie Elizabeth'	=	'Carter's Seedling.'
'Hoary Morning'	=	'Bachelor's Glory.'
'Ball's Pippin'	=	'Lane's Oakland Seedling.'
'Allington Pippin'	=	'Paradise Pippin.'
'Cox's Orange Pippin'	=	'Fugglestone Pippin.'

PENTSTEMONS FROM THE NEW YORK ROCKY MOUNTAIN EXPEDITION, 1936.

By J. T. WALL, Wisley.

THE expeditions undertaken by the New York Botanic Garden and W. INGWERSEN simultaneously in 1936 resulted in the introduction of several new species, and authentic material of some Pentstemons often misnamed in gardens.

Over forty packets of Pentstemon seeds were received from the N Y. expedition. Many failed to germinate, seedlings of others soon died, and some repetition lowered the number of species eventually grown. Fourteen packets were received from W. INGWERSEN'S expedition and fair germination was obtained. For the large number of seedlings a small border was allotted, consisting of well-cultivated light sandy soil with a western aspect. Only one species failed to survive: this died off in early April, and was a most interesting looking plant, *Pentstemon axilifolius*. The prolonged periods of drought and attacks of root aphis killed two other stocks and the weaker members of others, indicating once again that this genus does not like dry and sunny exposures.

Even on the Wisley rock-garden with its natural northern aspect we find that the cool side of a rock is appreciated, providing there is good drainage.

In these notes only plants that have flowered or have the appearance of being able to stand another winter are touched on.

P. coloradensis (No. 52) is a most interesting sub-shrub with short matted red stems covered with sessile linear grey foliage. Flower spikes rising to 6 inches bear a cluster of pale mauve or lilac wide-mouthed blossoms, calyx lobes and exterior of tube viscidly hairy, interior of the flower with a few scattered hairs and brown veinings on the lower limb. Collected on Durango, Colorado, in sunny places at 6,000 to 7,000 feet. A distinct and neat acquisition with a marked resemblance to some species of Aethionema.

P. acuminatus (No. 7). Received as *P. angustifolius*, this species was identified as *P. acuminatus* at Wisley by Mr. R. D. TWEED. The intense blue flowers make it one of the most attractive finds of the expedition.

Producing an inflorescence up to 10 inches high, with eight to ten glorious blue flowers in a one-sided spike, cauline leaves broad, about 4 inches long, tapering to a sharp point, glaucous blue. Constitution of plant weak after flowering, seed produced freely. Collected in Montana.

P. angustifolius (No. 1). Unidentified when received, this Pentstemon was subsequently identified at Wisley. It is similar to the foregoing but with much narrower and less glaucous foliage and the flowers are more frequently marred by magenta. Collected near

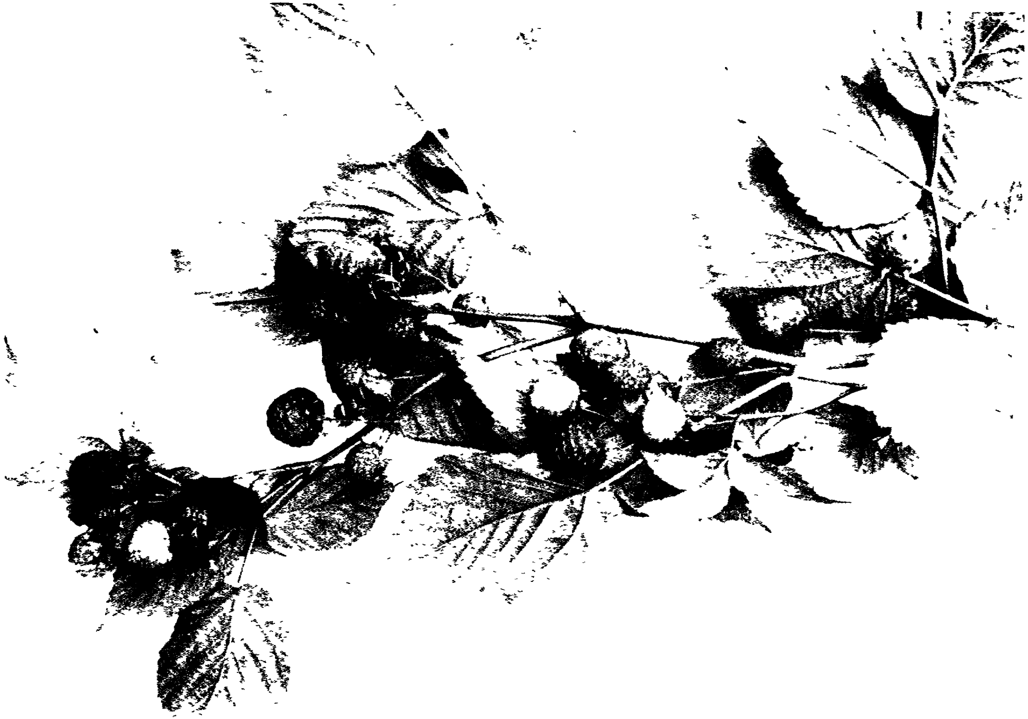


FIG 35 —RASPBERRY 'TAYLOR'

[To face p 188.

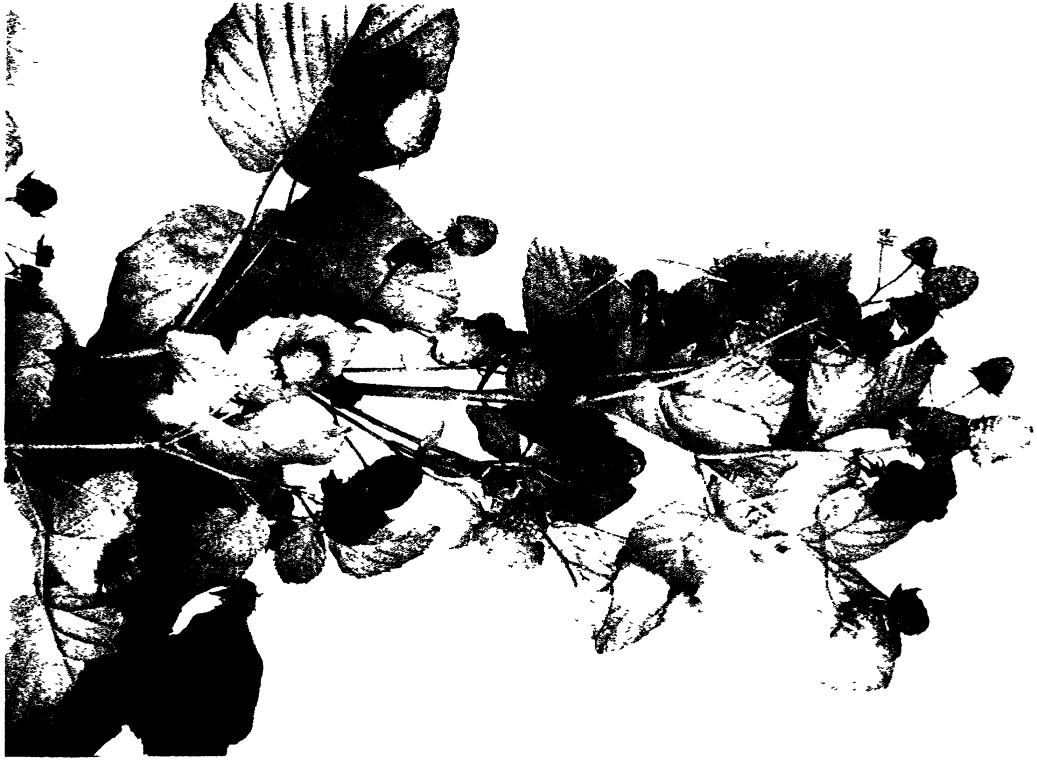


FIG 36.—RASPBERRY 'NEWBURGH' AT WISLEY

FIG. 37 CLEMATIS REHDERIANA

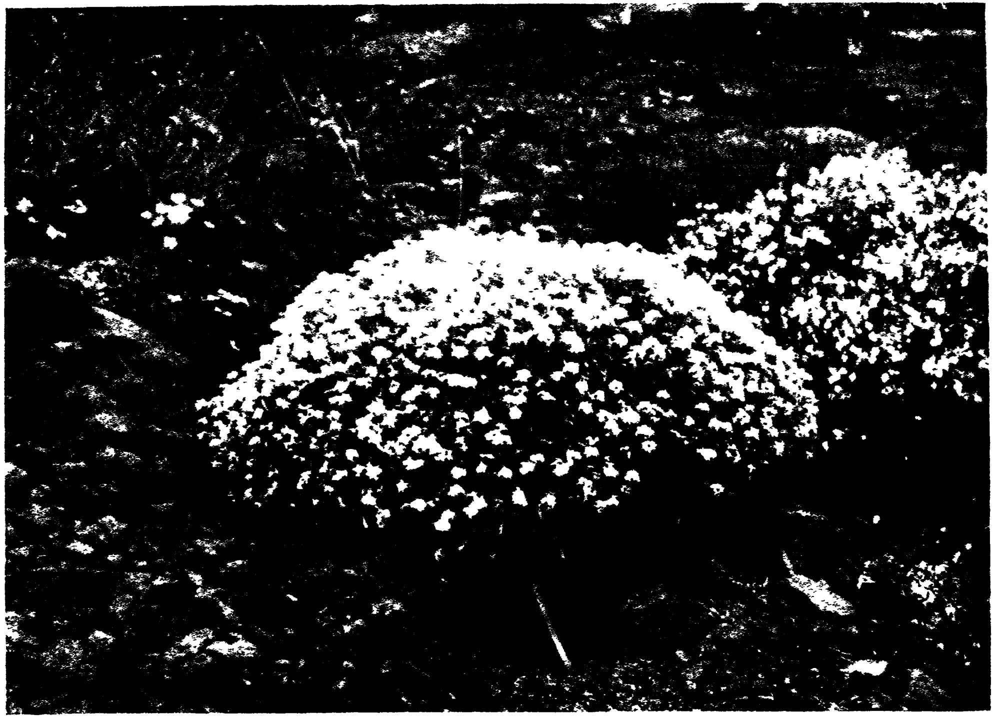


FIG 38 —ALYSSUM SPINOSUM IN THE LATE MR STEWART SANDEMAN'S GARDEN

[To face p 189

Potter, Nebraska. A desirable plant but not so vigorous as *P. acuminatus*.

P. albidus (No. 2). Identified at Wisley, this plant had not been seen in flower when collected at Potter, Nebraska. It is a most pleasing new introduction, but apparently resents the conditions at Wisley for only one plant remains from the fourteen planted out. *P. albidus* forms a neat bush one foot high, with ash-green ovate-acuminate foliage, entire or slightly toothed at the margin. Flowers in axillary cymes, white, lower limb deeply cleft into three distinct lobes, tube faintly flushed lilac at base with five to seven short red lines adorning the throat. Calyx lobes pubescent half the length of tube. Flowered in July ; a little seed was saved from this distinct and pretty acquisition.

P. crassifolius (No. 4). This species was collected in Yellowstone National Park, and has not yet flowered with us. It is said to attain 15 inches in height. The plants are strong and apparently distinct from plants previously cultivated under this name.

Pentstemon sp. No. 97. Identified at Wisley as related to *P. erianthus*, there is but little doubt that this name will be confirmed. This is probably the first introduction of this species into cultivation in Europe. The plant just misses being first-rate None, however, will gainsay its interest. It forms a tuft of narrow glaucous foliage, glabrous with undulate margins, from which rise the two or three spikes of large pale mauve flowers. The wide unduly expanded mouth is full of long white hairs, even larger ones adorning the anther tips. Collected in New Mexico at 6,000 to 7,000 feet. In cultivation flower stems will reach to a foot high, but after flowering there is little constitution left in the plant to survive another winter.

P. glaber (No. 90) is a name already well known in our gardens, though not infrequently falsely represented. A variable plant 15 to 18 inches high with glabrous shining green broadly lanceolate foliage in spreading tufts, the cauline leaves being sessile and opposite. Flowers rosy-purple with a white underthroat ; in some forms the flowers turn to a good attractive blue. Collected at 8,000 ft. on Big Horn Mountains.

P. glaber var. *alpinus* (No. 31). Sometimes afforded specific rank, this plant proved a vigorous grower with showy large blue flowers occasionally flushed with magenta. Contrary to expectation this plant did not survive after flowering. A bad attack of root aphis may have proved too much for it. Collected on Pike's Peak at 8,000 to 9,000 feet.

P. missoulensis (No. 125). Seeds under this number were received as probably representing two distinct species. Only one of our plants (and this unflowered) shows any marked variation from the bulk. This plant, too, is probably new to cultivation in this country, and if its present promise is maintained it will prove a great acquisition. In cultivation the leafy flower stems rise to 18 inches, the large flowers being of a good pale blue. The short tubes have on their exterior short glandular hairs or downy pubescence, long white hairs fill the throat, and a tuft of buff-coloured hairs graces the stigma. Stout and leathery, the foliage is of a dull grey-green, roughly ovate in outline with a variable margin that may be coarsely crenulate, entire, or serrate; petiole 1 to 2 inches long; cauline leaves sessile, opposite, enfolding the stem. Collected from Missoula, Montana, from whence the plant takes its name.

P. exilifolius (No. 54) did not survive at Wisley in the open ground or under cover. A plant of most interesting appearance said to have white flowers. A caespitose plant from the Laramie plains at 7,000 feet a "frame scree" would possibly suit all its requirements; it certainly looked worth the bother.

The following plants from W. INGWERSEN's expedition flowered well and are likely to become good garden plants.

P. diffusus roseus (No. 83) forms a somewhat shrubby plant with bright green crisp foliage, rising to about 10 or 12 inches high. The flower spike of rich rosy-hued flowers attains 6 inches or so above this. Leaves ovate or ovate-acuminate are from 2 to 4 inches long with regular coarsely toothed margins, the tapering petiole being about 1½ inch long. A handsome, strong, vigorous plant, the bright cheerful flowers are produced over a long period.

P. Richardsonii (No. 116) proves at last to be the true plant. It is a most distinct plant easily recognized from the usual *P. campanulatus* found under this name. This species forms a diffuse stiffly woody subshrub a foot or so high, above which the open panicles of rosy-pink flowers rise some 6 inches. The foliage is variable, being either laciniate or with broad sharply pointed lobes and a wide blade; minute blackish spots are noticeable on the foliage resembling obscure punctations. Flower stems downy towards their tips; tube of flower short, abruptly swelling into the corolla; corolla hairy on the exterior, glabrous within; stigma with a few long hairs at the tip; calyx lobes short, spreading, downy pubescent, lanceolate. Although variable this is a showy shrub. The best form at Wisley was one with less laciniate foliage and very deep rosy-purple flowers.

P. secundiflorus (No. 75). A rosette of glaucous broadly linear foliage from which rises the 2-foot stem bearing flowers in axillary clusters, generally mauve flecked and splashed with blue, with a widely expanded glabrous tube having a few purple lines in the throat. Of vigorous growth this showy plant does not maintain its early promise after flowering, most of the plants having succumbed since seed was collected. Other growers may be more fortunate, as another form of *P. secundiflorus* (No. 12), although less strong in habit, has formed quite nice plants since flowering.

Other Pentstemons from this expedition showing promise but as yet unflowered are *P. Davidsonii roseus*, *P. Menziesii*, *P. Scouleri* and *P. fruticosus*—a distinct plant this last with rounded glossy fleshy leaves.

My thanks are due to Mr. R. D. TWEED, who took such an interest in this collection of plants and their identification, and for his ready help at all times.

CLEMATIS REHDERIANA.

By B. O. MULLIGAN, N.D.H.

CLIMBING plants which flower during September are not so numerous that we can afford to overlook one as generous as this in its panicles of fragrant blossoms, and as vigorous and free in its growth. There are others of its race which flower about this season, for instance *Clematis tangutica*, *C. Veitchiana*, and *C. paniculata*, but none of them excels *C. Rehderiana* in combination of qualities appealing to the average gardener. For this reason it is regrettable that the species is not more often seen draping an old Apple or Pear tree, or scrambling over and into some other suitable support.

The illustration (fig. 37), from a photograph taken in late September in Mr. N. G. HADDEN'S garden of good plants and perennial interest at West Porlock, Somerset, is of a specimen which came originally from Messrs. LEMOINE of Nancy, France, in 1925. Mr. HADDEN tells me that it is hard-pruned each winter but makes rampant growth over its supporting larch poles, annually reaching a height of about 10 feet and width of 8 feet. It bears a profusion of pale yellow bells and has a delicious Cowslip scent. The typical Clematis silky-tailed fruits also have a decorative quality later in the year.

Other illustrations of the species may be found in the Gardeners' Chronicle, xlviii, fig 129 (1910), and The Garden, lxxv, 557 (1911), both under the name of *C. nutans*. A brief *résumé* of the history of *C. Rehderiana* will not be out of place here.

This climber is a native of western Szechwan, China, where in the past it was collected by Mr. A. E. PRATT, Père SOULIÉ, Père AUBERT, and Dr. E. H. WILSON ; and more recently in north-western Yunnan by Dr. H. HANDEL-MAZZETTI. WILSON described it (in Plantae Wilsonianae) as being " very common around Tachien-lu, rambling over shrubs in situations fully exposed to the sun." It was, however, first introduced to Europe through seeds sent by Père AUBERT from the same district to M. L. HENRY in Paris, where it flowered in 1899 and was erroneously identified as *C. Buchananiana* var. *vitifolia* of Hooker fil. and Thomson. A full account of this introduction will be found in Révue Horticole, 1905, p. 437, accompanied by a figure.

In the early years of the nineteenth century Mr. W. J. BEAN obtained it for Kew from the nurseries of Messrs. SIMON-LOUIS frères at Plantières, near Metz, while plants raised from WILSON'S seeds appear to have flowered for the first time in this country in the autumn of 1910, whence the illustration in the Gardeners' Chronicle for that year.

In 1913 Messrs. REHDER and WILSON described it (in Pl. Wils., i, 324) as *C. nutans* var. *thyrsoidea*, distinguished from *C. Buchananiana*, amongst other characters, by the sepals being smooth instead of densely pubescent on the inner surface. The following year, however, it was raised to specific rank by Professor W. G. CRAIB (in Kew Bulletin, 1914, pp. 150–1), with the name *C. Rehderiana* and distinguished from *C. nutans* of ROYLE by the pubescent filaments of the anthers. *C. Veitchiana*, a closely allied species collected by WILSON and published at the same time, is distinguished by the leaves being twice instead of once pinnate.

C. Rehderiana is a perfectly hardy and vigorous climber from western China, which has been cultivated in Europe for almost forty years, whose attractive habit of flowering freely in the autumn and producing a quantity of pale yellow scented bells is to be commended to all gardeners.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Clivia 'Marga Schröder.' A.M. February 21, 1939. From Baron Bruno Schröder (gr. Mr. F. A. Bush, N.D.H.), Dell Park, Englefield Green. A very handsome variety of this well-known greenhouse plant. The flowers are of excellent form, 3½ inches diameter, Nasturtium-red, B.C.C. 14/1; with aureolin, B.C.C. 3/2, at the base of the broad rounded segments. The plant exhibited carried two fine umbels of 10 and 9 open flowers and buds, and the variety was raised at Dell Park.

Crocus chrysanthus 'Zwanenberg Bronze.' A.M. February 21, 1939. From G. P. Baker, Esq., V.M.H., Sevenoaks. *Crocus chrysanthus* is remarkable for the range of variation it exhibits in flower-colour in both its wild and garden forms. The ground-colour may be sulphur-yellow, white, lilac or orange, with much or little feathering or suffusion of purple, brown or intermediate hues. The present variety is a vigorous, free-flowering plant with medium-sized flowers about two inches wide when fully expanded, buttercup-yellow (Horticultural Colour Chart 5) inside, flushed externally on the outer segments with bronze.

Cymbidium × 'Harmachis.' A.M. February 7, 1939. This elegant hybrid between *C.* × 'Curlew' and *C.* × 'Flamingo' bore an erect spike of three well-formed flowers, the sepals and petals creamy-white, the labellum rendered very conspicuous by the large crimson area on the front lobe. Exhibited by Messrs. H. G. Alexander, Tetbury.

Cymbidium × 'Rio-Rita' var. 'Rajah.' A.M. February 7, 1939. This robust plant bore an arching spike of ten well-formed flowers, of an uncommon reddish-brown colour with darker venation. The labellum bears a marginal zone of reddish-crimson. The result of crossing *C.* × 'Pearl' with *C.* × 'Ruby.' Exhibited by Messrs. McBean, Cooksbridge.

Odontioda × 'Patra.' A.M. February 21, 1939. This charming hybrid bore a tall spike of 14 well-formed flowers, of uniform crimson-scarlet colour, the petals edged with rose and the labellum with a yellowish crest. The result of crossing *Odontioda* × 'Geisha' with *Odontioda* × 'Vesuvius.' Exhibited by H. S. Wharton, Esq., "Shelstone," Templewood Avenue, Hampstead.

***Primula malacoides 'Mauve Queen.' H.C.** February 6, 1939. Raised and sent by Messrs. Sutton, Reading. Plant of vigorous habit; flower spikes 16 inches long, freely produced. Flowers single, 1½ inch diameter, orchid purple, B.C.C. 31/1; eye Indian yellow, B.C.C. 6/2.

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* After trial at Wisley.

* **Primula malacoides 'Pink Sensation.' A.M.** February 6, 1939. Raised and sent by Messrs. Sutton. Plant 14 inches tall, of good branching habit; flower spikes arranged symmetrically and produced in succession. Flowers single, 1⅛ inch diameter, colour solferino-purple, B.C.C. 26/6; eye Indian-yellow, B.C.C. 6/1. A true and even stock.

* **Primula sinensis stellata 'Beacon.' A.M.** February 6, 1939. Raised and sent by Messrs. Sutton. Plant of vigorous habit, 15 inches tall; flower spikes freely produced. Flowers of 'stellata' form, 1¼ inch diameter, Azalea-pink, B.C.C. 618; eye sulphur-yellow, B.C.C. 1/1.

Romulea nivalis. A.M. February 7, 1939. From G. P. Baker, Esq., V.M.H., Sevenoaks. A small, Crocus-like, bulbous plant suitable for a warm 'pocket' in the rock garden. Each bulb produces one or two single-flowered scapes two inches high, and about three erect linear leaves overtopping the flowers. The perianth is deep orange in the throat, the spreading lobes whitish, passing to lilac at the tips.

Sansevieria trifasciata var. Laurentii. A.M. February 21, 1939. From C. H. Curtis, Esq., V.M.H., London, W.C. 1. From a creeping root-stock this variety produces clusters of from one to five erect, stiff leaves two to three feet long and two to four inches broad, transversely barred on both sides over the whole length with silvery light green and bright moss-green deepening considerably with age, and margined with golden yellow. This striking foliage plant is used extensively in the U.S.A. for room decoration, and might be equally popular in this country if more widely known. It tolerates unfavourable conditions without apparent injury, the specimen exhibited having lived —and grown—for twelve months in a London office, where it received scant attention.

* After trial at Wisley.

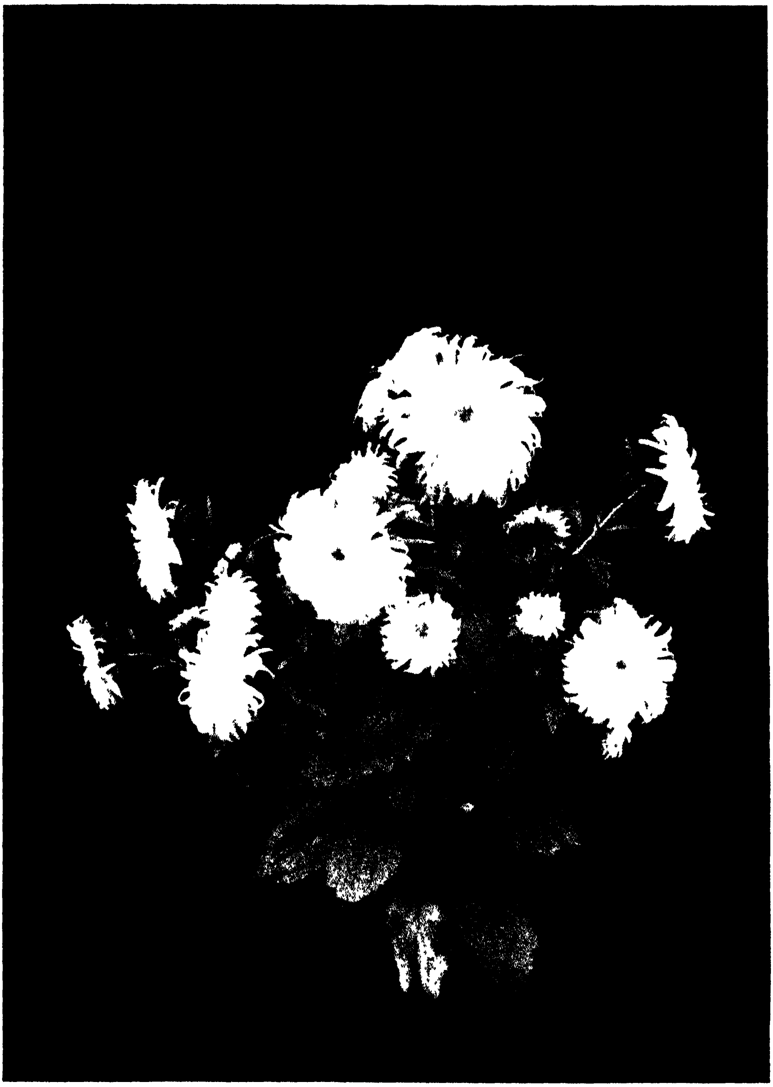

FIG. 39.—CHINA ASTER. TYPE A.
(SNOWDON.)

[*To face p.* 194.

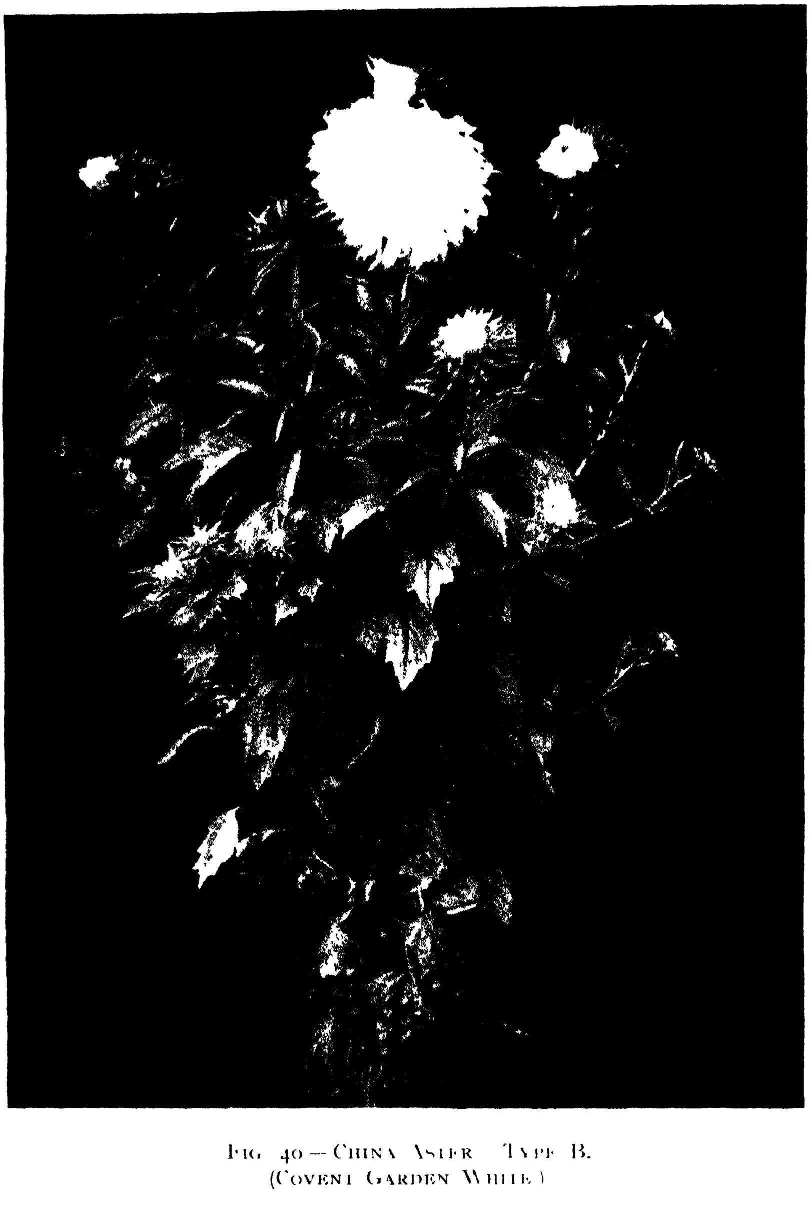

FIG. 40.—CHINA ASTER TYPE B.
(COVENT GARDEN WHITE.)

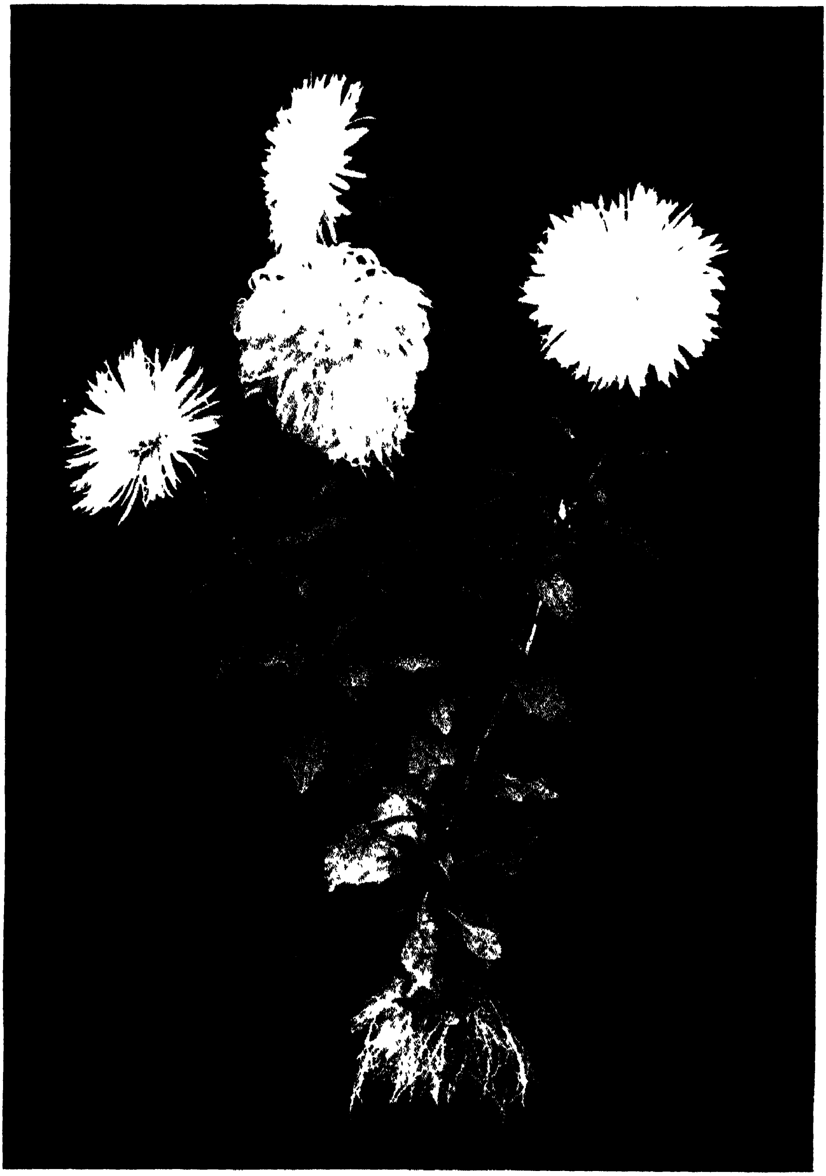

FIG. 41. CHINA ASTER. TYPE C
(CREGO PINK.)

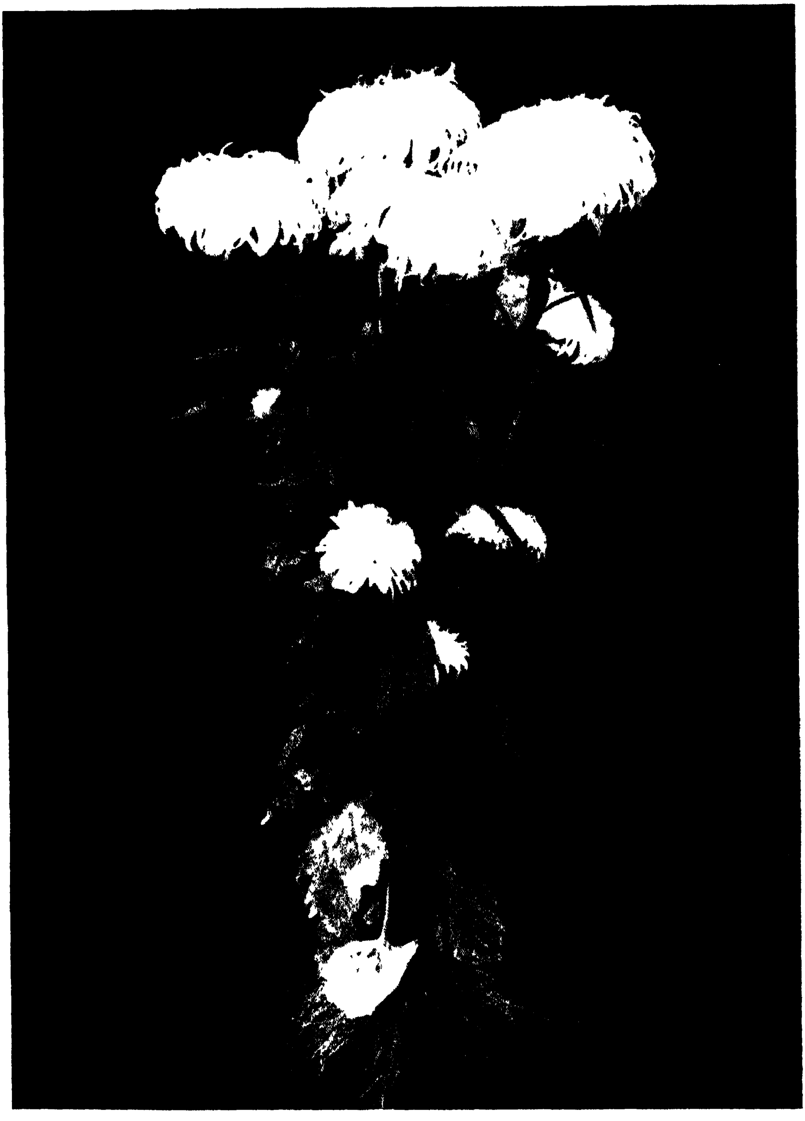

FIG. 42 CHINA ASTER TYPE D
(WHITE WONDER)

[*To face p.* 195.

AWARDS TO CHINA ASTERS AT WISLEY, 1938.

FIFTY stocks of China Asters, Ostrich Plume and Giant Comet types, were sent for trial in 1938. The seed was sown in the open ground, where they were intended to flower, in rows, eighteen inches separating the rows, on April 26, 1938. They all made good growth and flowered freely.

There appears to be confusion in naming the different " types," for varieties of differing habit of growth were sent under the same type name, and the varieties have therefore been re-classified into four types, the characteristics of which are given below, and arranged under these types in the notes which follow. Illustrations are given of each type.

The trial was inspected from time to time by the Judging Committee, which made its final recommendations for awards on the dates indicated.

The characters of each heading are :

Type " A " (fig. 39).—Plant 1½ foot tall, of spreading habit, with its somewhat leafy branches arising from near the middle of the plant. Flowering during August. Rather more suited for bedding than as a cut flower.

Type " B " (fig. 40).—Plant 2½ feet tall, of bushy habit, the leafy branches arising from near the base and middle of the plant. Flowering during late September.

Type " C " (fig. 41).—Plant 2½ feet tall, of lax habit with few branches evenly spaced, arising from the base and middle of the plant. Flowering during early September.

Type " D " (fig. 42).—Plant 20 inches tall, of erect compact habit, with its flowering branches arising from towards the base of the plant. Flowering during early September.

Flowers White.

Type " A."

Snowdon (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). **H.C.** September 12, 1938. Plant 18 inches tall ; flowers 5 inches diameter, centre full, white. August 24.

The following variety belongs to this section :

SNOW QUEEN (Watkins and Simpson)

Type " B."

Covent Garden White (sent by Messrs. Ernst Benary, Erfurt, Germany). **H.C.** September 21, 1938.—Plant 2½ feet tall ; flowers 5 to 6 inches diameter, white. September 20.

The following varieties belong to this section

COVENT GARDEN WHITE (Clucas)	SNOWBALL (Harrison)
KING OF THE WHITES (Clucas)	CREGO IMPROVED WHITE (Bodger)

Type "C."

Triumph of the Market White (raised and sent by Messrs. Watkins and Simpson). **A.M.** September 12, 1938.—Plant 2½ feet tall; flowers 6½ inches diameter, centre full, white. September 5.

The following varieties belong to this section:

OSTRICH PLUME WHITE (W. H. Simpson)
BRANCHING COMET WHITE (W. H. Simpson)

Type "D."

White Wonder (sent by Messrs. Ernst Benary). **H.C.** September 21, 1938.—Plant 20 inches high; flowers 4½ to 5 inches diameter, white. September 5.

Flowers Primrose.

Type "A."

The following varieties belong to this section:

SUNBEAM (Dawkins)	GOLDEN MONARCH (Clucas)

Flowers of Flesh-pink Shades.

Type "B."

The following variety belongs to this section:

LOS ANGELES (W. H. Simpson, Clucas)

Type "C."

Wilt Resistant Crego Improved Pink (raised and sent by Messrs. Bodger Seeds Ltd., El Monte, Los Angeles County, California, U.S.A.). **A.M.** September 21, 1938.—Plant 2½ feet tall; flowers 4½ to 5 inches diameter, pale flesh-pink. September 16.

Flowers Salmon-pink.

Type "D."

Illusion (raised and sent by Messrs. Bodger Seeds Ltd.). **H.C.** September 21, 1938.—Plant 2 feet tall; flowers 3½ to 4 inches diameter, soft creamy salmon-pink. September 5.

Flowers of Rose-pink Shades.

Type "A."

Peach Blossom (raised and sent by Messrs. Bodger Seeds Ltd.). **C.** September 21, 1938.—Plant 18 inches tall; flowers 4½ to 5 inches diameter, light rose-pink. September 5.

The following variety belongs to this section:

OSTRICH PLUME SALMON-PINK (W. H. Simpson)

Type "C."

The following variety belongs to this section :

ENCHANTRESS (W. H Simpson, Bodger)

Flowers of Rose Shades.

Type "B."

Crego Rose (raised and sent by the Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **H.C.** September 21, 1938.—Plant 2½ feet tall ; flowers 5½ inches diameter, bright rose. September 20.

Type "C."

Leviathan Rose (raised and sent by Messrs. Watkins and Simpson). **H.C.** September 12, 1938.—Plant 2¼ feet tall ; flowers 5½ inches diameter, centre full, light rose. September 1.

Branching Comet Deep Rose (sent by Messrs W. H. Simpson and Sons, Monument Road, Birmingham). **C.** September 12, 1938.—Plant 2 feet tall ; flowers 5½ inches diameter, bright rose. September 10.

Wilt Resistant Crego Improved Deep Rose (raised and sent by Messrs. Bodger Seeds Ltd.). **C.** September 21, 1938.—Plant 20 inches tall ; flowers 4½ to 5 inches diameter, deep rose. September 5.

The following varieties belong to this section :

OSTRICH PLUME DEEP ROSE (W H. Simpson)

CREGO IMPROVED ROSE (Bodger)

EL MONTE (W. H. Simpson)

TRIUMPH OF THE MARKET ROSE (Watkins and Simpson)

Type "D."

The following variety belongs to this section :

SALMON QUEEN (W. H. Simpson)

Flowers Rosy-cerise.

Type "A."

Ostrich Feather Salmon (sent by Messrs. W. W. Johnson, Boston, Lincs.). **C.** September 12, 1938.—Plant 1½ foot tall ; flowers 4½ to 5 inches diameter, rich rosy-cerise. August 24.

The following variety belongs to this section :

DUCHESS OF YORK (Clucas)

Flowers of Rosy-red Shades.

Type "A."

The following variety belongs to this section :

OSTRICH FEATHER SCARLET (Johnson)

Type "D."

The following variety belongs to this section :

FIRE FLAME (Clucas)

Flowers of Rosy-magenta Shades.

Type "C."

The following varieties belong to this section :

BRANCHING COMET CRIMSON
(W. H. Simpson)
OSTRICH PLUME CRIMSON
(W. H Simpson)
TRIUMPH OF THE MARKET CRIMSON
(Watkins and Simpson)

Flowers of Lavender Shades.

Type "A."

The following varieties belong to this section :

BRANCHING COMET AZURE BLUE
(W. H. Simpson)
CREGO IMPROVED AZURE BLUE
(Bodger)
OSTRICH PLUME SKY BLUE
(W. H. Simpson)

Flowers Rosy-lilac.

Type "A."

The following variety belongs to this section :

OSTRICH FEATHER LAVENDER (Johnson)

Type "C."

The following variety belongs to this section .

CATTLEYA (Bodger)

Flowers Violet-blue.

Type "A."

Ostrich Plume, Mauve Queen (sent by Messrs. Harrison and Sons, St. James' St., Leicester). **H.C.** September 12, 1938.—Plant 18 inches tall ; flowers 4½ to 5 inches diameter ; deep violet-blue. August 26.

Type "C."

The following varieties belong to this section :

TRIUMPH OF THE MARKET LILAC MAUVE (Watkins and Simpson)
CREGO IMPROVED LIGHT BLUE (Bodger)

Flowers of Purple Shades.

Type "C."

The following varieties belong to this section :

BLUE FLAME (Bodger)
BRANCHING COMET DARK BLUE
(W H Simpson)
CREGO IMPROVED PURPLE (Bodger)
OSTRICH PLUME DARK BLUE
(W. H. Simpson)

HERBACEOUS PERENNIAL LOBELIAS AT WISLEY, 1938.

FORTY-EIGHT stocks of Herbaceous Perennial Lobelias were sent for trial in the spring of 1938, and three plants of each stock were planted on May 14, 1938. All grew and flowered well, in spite of the dry season. They were finally judged by a sub-committee of Floral " A " on August 26, 1938, who recommended the awards mentioned below.

Flowers White.

The following variety was grown in the trial:

SYPHILITICA ALBA (Forbes)

Flowers Rose-pink.

The following variety was grown in the trial:

MRS HUMBERT (Ladhams, Forbes)

Flowers Rose.

The following varieties were grown in the trial:

IBIS (Barr)
HAMWOOD SEEDLING (Smith)

Flowers of Carmine Shades.

Flamingo (raised and sent by Mr. E. Ladhams, Elstead Nurseries, Godalming, Surrey), **A.M.** August 26, 1938.—Plant 4½ feet tall, of compact branching habit; foliage reddish; flower spikes 15 to 24 inches long; flowers ½ inch diameter, rich carmine-rose.

The following varieties were grown in the trial:

ORION (Forbes)
CORALLINA (Ladhams)
CARMINE QUEEN (Forbes)

Flowers of Scarlet Shades.

Queen Victoria Improved (sent by Mr. A. Falconer, Stamford Park, Stalybridge, Cheshire), **A.M.** August 26, 1938.—Plant 5 feet tall, of compact, free branching habit; foliage dark red; flower spikes 2½ feet long very freely produced; flowers ½ inch diameter, rich scarlet (fig. 43).

The Test (sent by Mr. B. Wells, Hardy Plant Nurseries, Merstham, Surrey, and Mr. E. Ladhams), **H.C.** August 26, 1938.—Plant 5 feet tall, compact, with very dark reddish foliage; flower stems 30 to 36 inches long; flowers ⅝ inch diameter, deep rich scarlet.

The following varieties were grown in the trial:

Joyce (E. Ladhams)
Foxhunter (E. Ladhams)
Lady Gay (E. Ladhams)
Lord Ardilaun (Barr)
Gloire de St. Annes (Forbes)
Firefly (Barr, Smith)
Arthur Humbert (Wells)
King Alfred (Wells)
Huntsman (Barr, Smith)
Queen Victoria (Barr)
Kelmscott (Barker)
The Bishop (Forbes, Reid, Bradbury)
B. Ladhams (E. Ladhams, Forbes)
Morning Glow (Smith)
Charming (Wells)

Flowers Lavender-violet.

The following variety was grown in the trial:

Silver Queen (E. Ladhams)

Flowers of Purple Shades.

Gerardi (sent by Messrs. J. Forbes (Hawick), Buccleuch Nurseries, Hawick, Scotland), **H.C.** August 26, 1938.—Plant 4 feet tall, of compact branching habit; foliage dark green; flower spikes 15 to 26 inches long; flowers ⅜ inch diameter, violet-purple. Also sent by Messrs. Barr as 'Purple Emperor.'

The following varieties were grown in the trial.

Coronation (E. Ladhams)
Jean (Wells)
Riverside (Wells)
Elstead Purple (E. Ladhams)
Lesale (Walkden)
Jack Macmasters (E. Ladhams, Wells)
Purple Emperor (E. Ladhams, Forbes)
Purple King (E. Ladhams, Barr)
Leraft (Walkden)
Mulberry (E. Ladhams)

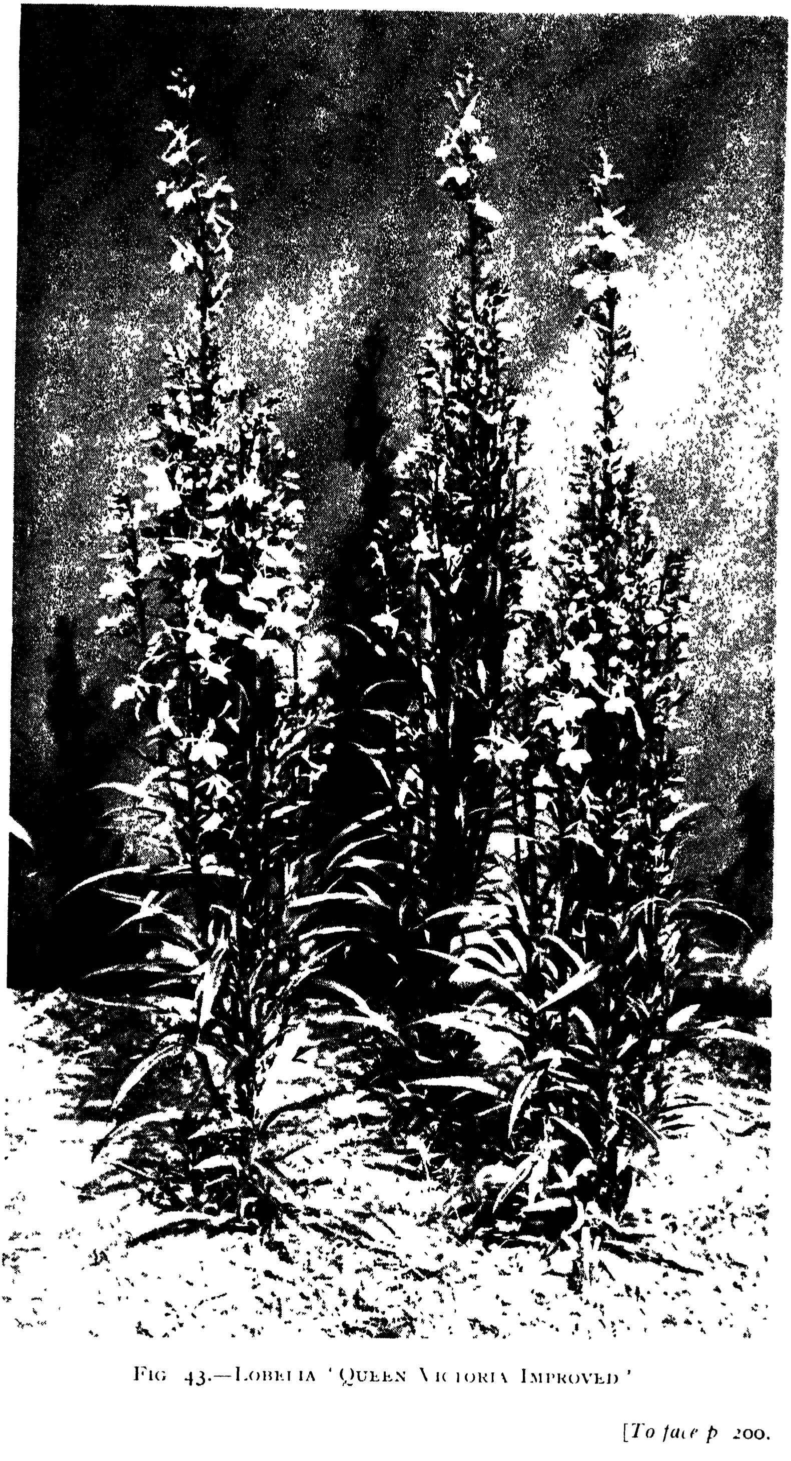

FIG. 43.—LOBELIA 'QUEEN VICTORIA IMPROVED'

[*To face p.* 200.

Fig. 44. Primula Bulleyana in the late Mr Stewart Sandeman's garden

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV
Part 5

May 1939

FORTHCOMING EVENTS.

CHELSEA FLOWER SHOW.

THE Chelsea Flower Show will be held in the Royal Hospital grounds from Wednesday, May 17, until Friday, May 19. Particulars of the hours of opening for Fellows and the prices and hours for the admission of the public are printed on the backs of the tickets. For Fellows and Associates there will, in addition, be a private view on Tuesday, May 16, starting at 2 o'clock. The special invitations admitting to this private view will be sent out about ten days beforehand.

The Automobile Association has again supplied the Society with a circular, enclosed in this issue of the JOURNAL, giving the official traffic arrangements together with a map showing the parking places and the entrances to and exits from the Show Grounds.

Fellows are *particularly* asked to study this plan and the traffic arrangements, as the entrances and exits have been altered this year in order to provide greater comfort for those entering and leaving the grounds.

There will be an *entrance only* from the Royal Hospital Road, and not an entrance and an exit. The exit in the direction of the Royal Hospital Road will be through the Ranelagh Gardens to the Chelsea Bridge Road at the northern end of the grounds. There will be *an entrance and an exit* to and from the Embankment.

Fellows and Associates are also asked to note that self-propelled or invalid chairs cannot be admitted on Wednesday, May 17. On Thursday and Friday, May 18 and 19, they will be admitted between the opening hour and 12 noon on payment of 5*s*. for each chair, which includes the attendant. It will add greatly to the comfort of those using the invalid chairs as well as those visiting the show if these regulations are carefully followed.

There is every prospect, provided the weather is kind, of Chelsea Show proving, as it has always done, a great attraction to the horticulturist, and Fellows are, therefore, reminded that the least crowded hours are the early and the late.

CALENDAR.

On June 6 (12 noon to 7.30 P.M.) and 7 (10 A.M. to 5 P.M.) there will be a Fortnightly Show in combination with the Iris Society and its Show (the Iris Society's Show opens at 1 P.M. on June 6). The third competition for a Sewell Medal (see January JOURNAL, p. 31) will be held, and on this occasion only one medal is offered and that for an amateur's exhibit. Entries for this competition must be made on special forms obtainable from the Secretary, and the completed forms must be received not later than by the first post on Wednesday, May 31.

At 3.30 P.M. on June 6 there will be an Iris discussion which will be opened by Miss L. F. Pesel speaking on "Iris Colours—Harmony and Contrast."

A lecture will be given at 3.30 P.M. on June 7, under the auspices of the Institute of Landscape Architects, by Mr. Christopher Tunnard on "The Modern Movement in Landscape Architecture."

From 2 to 4 P.M. on June 7 and 8 a demonstration will be given at Wisley (weather permitting) on the Summer Pruning of Shrubs. Fellows wishing to attend the demonstration should inform the Director of the Gardens beforehand, mentioning the day.

The second Fortnightly Show of June will take place on June 20 (12 noon to 7.30 P.M.) and 21 (10 A.M. to 5 P.M.) in the New Hall, and at the same time and place the London and South of England Viola and Pansy Society's Show.

In the Old Hall at the same dates and times the Cactus and Succulent Society will hold its Show.

On June 20, at 3.30 P.M., a lecture will be given by Sir Arthur Hill, K.C.M.G., F.R.S., V.M.H., on "Pelargoniums."

The Lily Group will hold a Question and Answer meeting on June 20, at 4.30 P.M., in the Restaurant of the Old Hall (see p. 203).

At 3.30 P.M. on June 21 an informal talk will be given on some paintings of S. American plants.

On June 23 (1 P.M. to 7.30 P.M.) the British Delphinium Society will hold its Show in the New Hall, and the National Sweet Pea Society will hold its Show in the Old Hall. Fellows' tickets admit free.

EXAMINATIONS.

On June 9 the Teachers' Advanced Practical Examination will take place at Wisley.

The Preliminary Practical Examination for the National Diploma in Horticulture will take place at Wisley from June 12 to 16, and the Final Practical Examinations for this Diploma will take place at Wisley from June 20 to 23 and June 27 to 30.

THE LILY GROUP.

There will be a meeting of the Lily Group on June 20, at 4.30 P.M., in the Restaurant of the Old Hall, and members will be invited to put questions on any matter connected with Lilies, Nomocharis or Fritillaries, and arrangements will be made for the questions to be answered as far as possible.

AUTUMN SHOW.

As already announced arrangements have been made to hold an Autumn Show in Earl's Court on Wednesday, Thursday and Friday, September 13, 14 and 15, and as this event does not appear on the tickets nor in the January JOURNAL Calendar, Fellows and Associates are particularly asked to make a note of it in their diaries so that it may not be overlooked.

INFORMAL TALKS.

The informal talks that were given at the March meetings, the first by Mr. F. G. Preston and the second by Mrs. G. Anley, were very well attended. To give some idea of what happens at these talks to those who have not yet attended one, the following list indicates subjects taken by the speakers: *Magnolia Campbelli*, *Viburnum* × *Burkwoodii*, *V. Carlesii*, *Forsythia spectabilis*, *F. suspensa*, a number of Show Daffodils, rock plants such as *Calceolaria Darwinii*, *Primula marginata*, Saxifrages, Dwarf Conifers, etc., thus giving a wide range on which information was obtainable. The discussions took place after the talk in a very free manner. The comments upon these informal talks have been very favourable, but there is one point that has been raised as to whether 3 P.M. or 3.30 P.M. is the right time. If Fellows attending or desiring to attend the informal talks have any preference the Secretary would be pleased to hear of it. It is to be remembered that the informal talks take place on the second day of two-day shows when the show closes at 5 o'clock.

There will be, of course, during this year one or two gaps in these talks owing to other arrangements having been made before their institution, but it is hoped that next year they will become a regular feature on the second day of all two-day shows.

RHODODENDRON CONFERENCE.

The Rhododendron Conference, which the Society is holding in conjunction with the Rhododendron Association, will take place in 1940 on May 7, 8 and 9, and arrangements for the programme are progressing satisfactorily. The programme will contain such subjects as: Rhododendrons in the wild, survey, geographical distribution, and story of discovery of Rhododendrons; Modern Rhododendron Hybrids and their uses in the garden; Propagation; Greenhouse Rhododendrons; Hardy hybrid Rhododendrons, their cultivation in country and town; and Rhododendron species in a cold situation, etc.

Concurrently with the Conference there will be a three-day Rhododendron Show with competitive classes. Visits to gardens will also be arranged.

Fuller details of the programme will be published from time to time in these notes, but Fellows interested in Rhododendrons are asked to notify the Secretary so that their names may be registered.

THE SEVENTH INTERNATIONAL CONGRESS OF GENETICS.

The Seventh International Congress of Genetics will be held in Edinburgh, Scotland, from August 23 to 30, 1939, and any Fellows who are interested in this subject, and desire to take part in the Congress, are invited to apply to the General Secretary, Professor F. A. E. Crew, F.R.S., Institute of Animal Genetics, West Mains Road, Edinburgh 9, Scotland.

HALL LETTINGS.

The Halls have been let as follows:

A Westminster Food and Wine Market will be held in aid of the Westminster Hospital Rebuilding Fund on May 10 and 11. For further particulars apply to Mrs. A. Croxton, 32 Buckingham Palace Road, S.W. 1.

An Antique Caledonian Market in aid of the Service Fellowship Association will be held on May 17 and 18. For further particulars apply to Mrs. Charles Wintour, The Grange Cottage, St. Michaels, Tenterden, Kent.

WISLEY IN MAY.

Of plants in the standard collections or under trial there are Lupins, Pæonies, and towards the end of the month the earlier Irises of the tall bearded section planted on the hillside above the Rose borders, while in the newly laid out piece of land on the west side of Battleston Hill are planted about 400 bushes of hybrid Rhododendrons formerly grown by Mr. Lionel de Rothschild at Exbury House. There is considerable promise of flower in the buds apparent at the present time, but much will depend on the weather before these open and in any case during this first season in their new surroundings the plants can scarcely be expected to be at their best.

In the Alpine House, to which many visitors first make their way in the spring months, there are such interesting and beautiful plants as Androsaces, Campanulas, Silenes, *Ramondia Myconi* (*pyrenaica*), *Eritrichium strictum*, *Iris gracilipes*, and *Phlox mesoleuca* now in flower, whilst on the rock garden are species of Primula, Viola, Phlox, Aethionema, and Geranium, with *Lithospermum diffusum* var. *erectum*, *Anacyclus depressus* and *Meconopsis quintuplinervia*, to mention only a few of the best and most decorative plants. Those who have time to look carefully will doubtless discover others for themselves in the many crevices and pockets provided for the inhabitants of this part of the Gardens.

Primulas are out in the Wild Garden, particularly the members of the Candelabra section, including *Primula helodoxa*, the Glory of the Marsh, with its tall yellow-flowered stems, *P. japonica*, *P. pulverulenta*, and the hybrids ' Red Hugh ' and *chunglenta* with scarlet or salmon-red whorls of blossoms. Certain of the Rhododendrons will also be found here in bloom, notably the lovely *Rhododendron Souliei*, several forms of *R. obtusum*, and the well-known and showy hybrids ' White Pearl ' and ' Pink Pearl,' both represented by very large bushes. Another shrub not to be overlooked is the pink form (var. *rubra*) of the North American *Cornus florida*, which will be found in the clearing in the middle of the Wild Garden, as well as in the Azalea Garden, whilst more lowly but almost equally attractive in their way are the variously tinted Trilliums which grow under the Oak trees near the Primulas.

Although the spring-flowering Heaths, such as *E. australis* and *E. arborea* var. *alpina*, come to the end of their season this month, they will be succeeded by the Brooms, *Cytisus multiflorus* (*albus*) and the many coloured forms of *C. scoparius*, of which several will be found in Howard's Field.

Of flowering shrubs in Seven Acres there may be species of Berberis, Exochorda, Lonicera and Spiraea, but the beauty of the Crab Apples will probably be over by the beginning of the month, unless the season is a late one. In Howard's Field, however, no visitor should fail to see the large collection of over 200 varieties of Lilacs, which show every sign of an exceedingly fine display in May should the weather be favourable ; here also towards the end of the month several species of Cistus and Rosa, among the large number of each which are grown, should open their flowers.

Returning by way of the Azalea and Award of Garden Merit Gardens, visitors may find some of the earlier Azaleas open in the former, and in the latter the showy double Gorse, *Ulex europaeus plenus*, the stately white *Meconopsis superba*, and the Rose species, *R. altaica* and *R. Hugonis*, the forerunners of their vast race.

The glasshouses have some especially notable plants to show at this time. In the large Temperate House the Bottle-brush, *Callistemon citrinus splendens*, *Grevillea Banksii*, *Asystasia bella* with somewhat tubular lilac flowers, and the rich red *Macleania insignis* are some of the chief, together with the curiously shaped South African *Strelitzia reginae*, called the ' Bird of Paradise Flower ' on account of its crested formation. In the second house Pelargoniums, Fuchsias, and Calceolarias are likely to form the principal display, and in the Half-hardy House nearest to the Laboratory are the uncommon shrubby *Ebenus cretica*, with pink spikes resembling a small Lupin, the hybrid blue Pea *Lathyrus* × *Bartonianus*, the yellow *Candollea cuneiformis*, *Pelargonium Schottii*, and the bulbous Babianas and *Tritonia hyalina* with deep amethyst and salmon-red flowers respectively.

DAFFODIL GARDENING.

By Guy L. Wilson, F.R.H.S.

[Read March 21, 1939; Mr. E. A. Bowles, M.A., F.L.S, F.R.E.S., V.M.H., in the Chair.]

The first essentials in the consideration of the cultivation of any plant are soil, situation, and the hardiness of the plant. Fortunately for us, the Daffodil, which is indispensable and the most lovely of spring flowers, is also the most accommodating, and it will withstand any British winter with impunity. The late George Herbert Engleheart, who spent the greater part of a very long lifetime in growing Daffodils, used to say that "Any loam from very sandy to quite stiff clay, that is well drained and moist and cool a few inches down, will grow good Daffodils."

I am sure I may take it for granted that all gardeners are nowadays aware of the inestimable value of Daffodils for naturalizing in grassland or woodland. The beauty of effects that can be achieved by using them in such surroundings can scarcely be exaggerated; some indeed there are who declare that this is the ideal setting for them. I do not propose, however, to dwell much upon this aspect of their cultivation, beyond saying that when naturalizing bulbs it is essential to avoid any formality of grouping; they must look as though planted by natural agencies, and I think it best not to mix different varieties in the same group or drift. Further, I think that, generally speaking, the older varieties are best adapted for naturalizing. The fine recent introductions, of which present-day Daffodil Shows are largely composed, are the result of several generations of breeding under conditions of good cultivation, and they seem to need garden cultivation to keep them up to scratch, whereas if put down and left in grassland many of them are apt to dwindle and disappear. Not so 'Golden Spur,' 'Emperor,' *Barrii conspicuus*, 'Albatross' and such-like. I do know of a couple of old varieties that are undesirable for naturalizing on account of their habit of multiplying so fast that they soon become overcrowded and flowerless: one is 'Princeps'; the other, which is inclined to become flowerless especially if grown under the partial shade of trees, is the lovely *Poeticus recurvus*: in such a situation *Poeticus ornatus* should be employed instead, as it seems to increase much more slowly and continues to flower indefinitely.

Our modern Daffodils are so beautiful that all will agree that they merit a little special consideration as to site and cultivation. The site you choose will be to some extent governed by the purpose for which you grow your Daffodils. If you are an ardent enthusiast and exhibitor, you will probably devote a special plot to their cultivation, with the best advantages of shelter and aspect at your command. For such purpose a position open to the sun is best, and if at the same time it can be so situated as to have the benefit of shelter from prevailing winds, provided by belts of trees that are not close enough to allow of their roots robbing the soil too much, it is of immense advantage in saving the flowers from wind damage. Where natural shelter is not available it can be provided in good measure by 6-foot fences of hop screening.

The chief factor in growing fine flowers is deep and thorough cultivation of the soil. My own method for getting a plot into condition for bulbs is to manure it and crop it with Potatos or other vegetables the season before it is intended to plant the bulbs. When the ground is cleared in the autumn, the soil is thrown up in high ridges, the bottom of the trenches between these ridges being dug over as deeply as possible. After the wettest winter weather is over the ridges are split and thrown up again where the trenches formerly were, the trenches between these new ridges being in turn deeply dug; should time and opportunity permit, this operation can be repeated a third time: this exposes the soil to the greatest possible extent to the beneficial action of frost, sun and air. In July the plot can be levelled and forked over, and two or three weeks before the bulbs are planted the beds can be made up and left to settle. Four feet or four feet six inches is a convenient width for the beds, with 18-inch paths between.

Bulbs should be planted in August or not later than the first half of September; therefore if you want to buy some new ones, send your orders immediately you receive your catalogues, or better still, place them at the Spring Shows, where you have the actual flowers before you to choose from. The depth to plant is governed by the nature of your soil and the size of the bulb, which varies widely according to variety: a good general rule is one and a half times the depth of the bulb itself, measured from base to nose, a little deeper in light, and not quite so deep in heavy soils. For the largest varieties the rows may be 12 inches apart and the bulbs 6 inches to 8 inches apart in the rows; for smaller things, such as Poets, 10 inches apart will suffice for the rows, while bulbs may be 5 inches or 6 inches apart in the rows.

Where exhibition flowers are wanted, it is best to lift and divide bulbs every second season; lifting should be done just when the foliage has turned yellow and will come away from the bulbs easily with a slight pluck. They should not be left longer, as rain may induce fresh root action, after which lifting would inflict a check. The time of ripening varies with season, locality, and variety, but occurs roughly in the last week in June and early July: some few varieties keep their foliage green very late, and must be dug before it quite dies down; it is better to lift a little too early than too late. The bulbs should be spread in suitable trays to dry in an airy shed. When quite dry they should be carefully and thoroughly cleaned of old roots and loose skins, and most carefully examined to see that all are perfectly healthy; they should then be replanted as soon as possible in a fresh plot.

Other crops should be grown for two or three seasons on the plot from which they were lifted to provide rotation, after which it can again be used for Daffodils.

As Daffodils, like other plants, are subject to several pests and diseases, those who grow good collections ought to keep a sharp look-out for these, and to this end I advise consulting an excellent little pamphlet, published by the Ministry of Agriculture and Fisheries. It is Bulletin No. 51, Narcissus Pests, which can be had from any bookseller, price 1*s*.

A site such as I have described as desirable for the cultivation of a special collection of Daffodils can often be found in the kitchen garden, where of course rotation of crop can easily be arranged. Again, one has often seen fine old-fashioned gardens where the vegetable and fruit plots form the hinterland of herbaceous borders: in such the plan of growing a collection of fine Daffodils as a crop in the vegetable or strawberry ground is an admirable one, as when they are in flower they are a feature of great interest and beauty at a time when the borders are as yet bare of bloom, and when they are over the slight untidiness of their dying foliage is screened by the oncoming occupants of the borders. Moreover, flowers can be freely cut for house decoration from such plots without the feeling that one is spoiling a garden picture; so such a site has much to recommend it, quite apart from exhibiting.

But most people will wish to employ these beautiful flowers for garden decoration. Plenty of ways of doing this to advantage can be found. I can recall many lovely spring garden effects with choice Daffodils as the leading feature. One was a long border of medium width, slightly sloping from back to front, backed by a tall thick hedge of something green, and edged by overflowing masses of the lovely old soft lavender Aubrietia; it contained clumps and groups of Daffodils in all their varying tones of gold and silver, orange and cream; stately Trumpets, dainty ethereal Leedsiis, rich cupped Incomparabilis and Barriis. The border of course contained herbaceous plants of various kinds, and Lilies, which flowered after the Daffodils were gone. Variations on such a theme will suggest themselves; for example, the effect might be enriched by the introduction of groups of 'Vulcan' and 'Ruby Gem' Wallflower.

Groups of Daffodils can of course be used with good effect in any herbaceous border; they look particularly attractive amongst herbaceous Pæonies whose young wine-red stems make a pleasant foil for their flowers.

An ideal garden site for fine Daffodils is to grow them in groups amongst deciduous shrubs. The shrubs provide welcome shelter for the Daffodils, and the Daffodils provide a display before most of the shrubs are in flower. A good object lesson on this style of planting may be seen in the R.H.S. gardens at Wisley, where the Daffodil trials are carried out in a large shrub border. In connexion with planting in conjunction with shrubs, I remember another charming Daffodil picture built around an informal little rock garden mound, on top of which a fine *Magnolia stellata* was in full bloom, like a cloud of white butterflies; while the surrounding slope and border were overflowing with a varied crowd of fine Daffodils, chiefly pale varieties—gleaming lemon and white bicolors, great white Trumpets, and big white, ivory and cream Leedsiis, like Eucharis Lilies; while crowding amongst their feet were indiscriminate masses of *Muscari* 'Heavenly Blue.' One can imagine a happy effect from planting some of the earliest golden Trumpets or clear yellow and orange-cupped Incomparabilis, in conjunction with Forsythias, and perhaps again a foreground scattering of Grape Hyacinth.

Groups planted in herbaceous and shrub borders may of course be of varying sizes, but generally speaking had better not be too small, say not less than a couple of dozen bulbs of a variety. Avoid the formal placing of small clumps of three or six bulbs at regular intervals. To get the best results, especially amongst shrubs, where the soil will be fairly full of roots, it is advisable to peg out the position of your bulb groups and remove the soil to a depth of 18 inches or 2 feet; discard any undesirable subsoil, place the remainder in a heap and enrich it by thoroughly mixing with it some really old and exhausted hotbed manure, a liberal sprinkle of bone meal, a little sulphate of potash, or better still a good dash of ashes from burnt hedge clippings and garden rubbish. If the soil in the chosen site is really poor it may be better to replace it with some from the vegetable beds. Bulbs planted in such informal situations may be left down for three years, after which time they had best be lifted and divided, and have their beds made up again, or be planted elsewhere.

Another excellent idea for the use of Daffodils in the garden is admirably set forth in an article by Mr. H. R. DARLINGTON in the 1936 issue of the R.H.S. Daffodil Year-book, in which he tells how he grows Daffodils with splendid effect in his rose beds. The good cultivation necessary for the roses no doubt provides a fat living for the Daffodils, which will make a beautiful display in the rose beds in the early spring, when they would otherwise be quite bare.

When we come to consider which varieties we shall plant, the choice is well-nigh bewildering. I shall confine myself to mentioning a few modern varieties that are of outstanding merit for garden decoration, and shall leave exhibitors and collectors to make their choice at our Spring Shows, with the assistance of specialists' catalogues, and the interesting Daffodil ballots published each year in the R.H.S. Daffodil Year Book.

Beginning with yellow Trumpets, 'King Alfred' and 'Dawson City,' though no longer new, must not be overlooked: they have the advantage of now being so reasonable in price that anyone can afford to plant them in quantity. 'King Alfred' is still one of the most beautiful of all Daffodils, and though it does not always continue to thrive in all soils and climates, as it can be bought as cheaply as the old 'Emperor' it is easy to replace bulbs that show signs of deteriorating.

Of newer ones I should recommend 'His Excellency,' one of my own raising: it is a vigorous plant, not too tall, and of such strong and sturdy habit that it never gets blown down; it is a very fine large flower of good quality, and the flowers are carried on their stems with a slightly upward pose, which makes them show up particularly well on the plant. For those who are attracted by size, I suggest 'Kandahar,' a real giant of splendid self-golden colour, great substance, immense vigour and great strength of stem; it is a most striking plant, though perhaps not everyone's "cup of tea," but it does attract more attention than most.

Turning to white Trumpets, I consider 'Beersheba' pre-eminent where it thrives; and curiously enough it seems to do best in our less favoured climates: it is seldom at its best in Cornwall or the south, but in the Midlands, or my bleak Ulster climate, or Scotland, it is a wonderful and glorious plant in its great vigour and freedom of bloom. It is also a first-class exhibition variety with possibly more first prizes to its credit at shows the world over than any other. In the south it may be found that 'Corinth,' another large and noble white of exceptional substance, will do better than 'Beersheba.' Both 'Beersheba' and 'Corinth' are early varieties. 'Eskimo' is to be recommended as an excellent mid-season white: it is very free-flowering, and of sturdy habit; the flower opens with a very pale lemon trumpet, but a few days of sunshine bleaches it to purest white. For succession a few bulbs of 'Kenbane' should be planted; it is a very fine large flower of great substance and strong sturdy habit, which in my late climate comes right at the end of April or early May, when the other whites are over.

Of bicolor Trumpets there is perhaps not so much choice, but 'Mrs. E. C. Mudge' is a large and very handsome flower, while the somewhat smaller 'Jack Spratt' is effective because of its clearly contrasted colour, the perianth being pure white and the slender trumpet brilliant lemon-yellow.

In the Incomparabilis section a multitude of good things are to be found, many of the best resulting from the work of the late P. D. WILLIAMS, who produced a strain of magnificent yellows, of which 'Havelock,' which was awarded a First Class Certificate at the Wisley Trials, is a garden plant of quite outstanding merit; its very large clear yellow flowers are of most beautiful form and balance, perfectly posed on tall stems of such strength that they withstand rough weather better than most. 'St. Ives,' another from the same raiser, is rather earlier than 'Havelock,' and is a large, most beautiful clear brilliant golden, somewhat star-shaped flower, well poised on a very tall stem of rigid strength, and having remarkably beautiful deep blue-green foliage. I once saw a neglected clump of this in the raiser's garden, producing a great sheaf of brilliant golden flowers—as lovely and refreshing a sight as anyone could wish to see. 'Carlton' is another of the series, a graceful yellow flower of the largest size and a plant of the utmost vigour. Turning to varieties having orange or red cups, now that the price of 'Fortune' is only some 10*s.* a bulb instead of twice as many pounds, everyone should have at least a little clump of this great plant, giving it as sheltered a spot as may be, on account of its great length of stem. It is first early, and its great glowing cups never fail to give one a thrill when they first appear. It is such an extremely vigorous and healthy grower that from two or three bulbs in a very few seasons one may have a nice little stock. 'Killigrew,' which gained an Award of Merit at the Wisley Trials, is one of the most vigorous and free-flowering of this vigorous section, and also one of the most beautiful; its large flowers are of perfect form, balance and quality, with smooth yellow perianth and deep tangerine-orange cup, which retains its colour moderately well. 'Garibaldi,' another which was honoured at Wisley, is somewhat smaller and later, having a clear yellow perianth and bright orange-scarlet cup, which holds its colour better than most. The fault of most red cups is that they burn in the sun, so make a note of 'Rustom Pasha' as a really magnificent garden plant of the future; it is still new and scarce, and being priced at £3 3*s.* a bulb cannot yet be planted indiscriminately. It is a beautiful large flower with wide-spread clear golden perianth; its cup opens dull orange and soon deepens to vivid tangerine-scarlet, which does not fade or burn, and it is well poised on a tall and exceptionally strong stem. There are several really first-class bicolors, i e. white and yellow Incomparabilis, of relatively recent introduction: 'Nissa,' the cheapest, is a flower of such consistent symmetry and smoothness that it is also excellent for show purposes: it has a smooth and most perfect pure clean white perianth, and its bright clear lemon crown shines like brass; it is tall and free-blooming. 'Bodilly,' slightly more expensive, is very beautiful in form and balance, and is also a very clean pure white and yellow bicolor. 'Polindra,' probably the finest of all, should be noted for the future, being still expensive, but it is a noble flower and plant, very large, of quite perfect form, balance and quality, perfectly poised on a very strong 2-foot stem, its vigour being equal to its stature.

Few really good red and white flowers are yet available in quantity, but I cannot understand why 'Folly,' raised by the late P. D. WILLIAMS, is not better known and more popular than it is, for it is beyond all doubt a plant of unique beauty and quality, its merits being duly recognized and honoured by a First Class Certificate at the Wisley Trials. It is rather late and lasts well, so is of much value for succession. Its large pure white perianth, which is of smooth texture, reflexes slightly, the petals having gracefully curving edges rather after the style of *Poeticus recurvus*; this gives the flowers great charm and distinction, making them as beautiful in profile as full face; the shallow bowl-shaped crown is clear orange-red, shading through orange to gold in the base, and retains its colour well; the flowers, which are admirably poised on stems of great strength, increase in size and beauty for days after they first open. As it is now a very reasonable price, no Daffodil lover should fail to plant it. One or two other red and white flowers may be found in the Barrii section, one of the best being 'Sunstar,' which is rather like a very large Poeticus, with its solid ivory perianth and very dark red eye; it is best grown in semi-shade to preserve the colour of the eye.

In the enchanting Leedsii section there is again an almost bewildering choice of very beautiful things. I shall first mention two, which gained the highest honour of First Class Certificate at the Wisley Trials: of these 'Tunis,' yet another of the late Mr. WILLIAMS' flowers, also took first place in the ballot of varieties for garden decoration in the 1938 issue of the R.H.S. Daffodil Year Book, and no one seeing a big patch of it at its best would be surprised. It is a very large flower of lovely form, balance, and great substance, boldly poised on a very strong 2-foot stem, which carries it above its beautiful stiff blue-green foliage; the widespread perianth is broad yet pointed, and slightly waved, while the large bold crown is gracefully flanged and serrated; when fully developed the great flowers are a warm ivory-white with a distinct coppery-gold rim to the crown. I can only say that in the mass they make a glorious picture which delights all who see them. The other F.C.C. plant is 'Marmora,' raised by BRODIE OF BRODIE, a flower of ideal form and proportion, that opens with white perianth and pale lemon crown, and soon passes to milk-white all over; it is very tall, and the flower keeps growing till it attains great size, its firm parchment-like substance making it exceptionally durable; it is also a splendidly vigorous grower—both of these are now quite reasonable in price. I must mention another absolutely first-class flower also bequeathed us by Mr. WILLIAMS, namely 'Niphetos.' It has the merit of being not only a faultless exhibition flower, but also an ideal garden plant: it would be difficult to conceive a more perfect flower with its very broad, smooth and flat white perianth, and perfectly proportioned beautifully frilled cream crown; then its poise on its very strong sturdy stem is just right to display it to full advantage. It is very vigorous and free-blooming, and being not so tall as 'Tunis' or 'Marmora' could come more to the front of a border. It is now becoming moderate in price and should be more widely known.

Most of the exquisitely dainty small-crowned Leedsii come right at the end of the Daffodil season: they are amongst the most delightful of all for cutting, and several varieties might well be planted. 'Samaria,' a milk-white flower of flawless quality and good substance, is one o the best, while 'Mystic,' 'Silver Salver,' and 'Addio' might also be noted.

The late Mr. P. D. WILLIAMS, to whom we seem to owe most of the best of modern garden Daffodils, gave us a charming and distinct race of Jonquil Hybrids, dainty things with rush-like leaves, yet strong-growing and free-flowering. They are a most delightful and welcome variant from the larger and heavier varieties. 'Trevithian,' which had a First Class Certificate at the Wisley Trials, is the most vigorous of the set; it carries from one to three flowers on each stem;

the flowers have smooth even perianths, and shallow cups of lovely quality, and uniform soft clear yellow colour.

I cannot conclude without mention of two most attractive Poetaz varieties, both of which were honoured at Wisley. First, 'Scarlet Gem,' which is a prolific bloomer and carries trusses of 4 to 8 flowers on each stem, the perianth being yellow and the cup bright orange-scarlet; and 'Glorious,' also very free-blooming, and bearing two or three good-sized flowers on each stem, the perianth being pure white and the cup scarlet. These probably do best in milder districts as they are early, and I have seen their flowers somewhat spoiled by severe frost, but at their best they are most effective.

The foregoing varieties, though of recent introduction as compared with, say, 'King Alfred,' are of known and outstanding merit as garden plants. I need scarcely add that there are hosts of others, some still newer, and he or she who comes under the spell of the eternal youth and beauty of this flower, that seems in itself the embodiment of Spring, will undoubtedly plant others, and still others, as season follows season, for the delight of Daffodil gardening grows with the passing years.

[The attention of Fellows seeking further guidance regarding the suitability of varieties for planting for garden decoration is called to the trials in progress at Wisley for the testing of the suitability of varieties for this purpose. A report appeared in the JOURNAL, R.H.S., **61**, pp. 301–315, and it was reproduced in the Daffodil Year-book for 1936.—*Ed.*]

DAHLIAS.

By A. J. COBB, F.R.H.S.

[Read January 24, 1939; Mr. J. B. RIDING in the Chair.]

THE Dahlia, as most of you probably know, is a native of Mexico. The fact that the foliage of Dahlias gets blackened by a few degrees of frost is common knowledge to all who grow them, and sooner or later most growers learn that the tubers will not stand any frost. It is often a bitter lesson to beginners. Though few plants have been improved by plant breeders, from the original wildling, more than the Dahlia, it still remains a fact that the susceptibility of the tubers to frost is much the same as it was as far back as records take us, and so far as we know from its beginning.

History tells us that the Dahlia was first discovered in Mexico as far back as 1575 by FRANCISCA HERNANDEZ, but it was not until 1789 that it was introduced into Europe. Credit for this is given to VICENTE CERVANTES, Director of the Botanic Gardens, Mexico, who sent seeds or roots to the Abbé CAVANILLES, Director of the Royal Botanic Gardens, Madrid.

In 1791 CAVANILLES published a figure in his Icones et Descriptiones Plantarum, naming it "Dahlia" after Mons. ANDRÉ DAHL, a noted Swedish botanist, and "pinnata" because of its pinnate or winged leaves. He later named two other forms *D. coccinea* and *D. rosea.* These three Dahlias were the parents of all the garden and show varieties until the introduction of the Cactus-flowered and more modern groups.

The Dahlias described by CAVANILLES were introduced into this country in 1798, being sent to Kew from Madrid through the agency of the Marchioness of BUTE. They were soon lost, however, and the uninterrupted cultivation of the Dahlia in this country dates from 1804, when a parcel of seeds was sent from Spain by Lady HOLLAND. CAVANILLES also sent seed of his three varieties to various botanic gardens in Europe, to Berlin and Dresden before 1800, to the Jardin des Plantes at Paris, and to Montpellier in 1802.

Dahlias spread to other English gardens, and here, as in Germany and France, the growers sought for double flowers, and soon obtained them.

Several of these double flowers were illustrated in the Dahlia Register, 1836. They were hemispherical, and became wonderfully popular, but the type changed in 1840 to the more solid ball-shaped blossoms of the show and fancy types. From 1820 to 1860 it is reported that Dahlia enthusiasm in England almost approached that of the earlier "tulip craze" in Holland, and large sums were said to have been paid for promising novelties. In 1829 the anemone-flowered type of continental origin was shown, but this never became very popular, though a few are still grown.

The Pompon type was introduced in 1850, being, I believe, first raised in Germany. The flowers are miniature counterparts of the old show varieties, and for exhibition purposes must not exceed 2½ ins. in width. Unlike the old show type these charming little flowers are very popular to-day, and annually a few new varieties are shown before the Joint Dahlia Committee for their inspection and judgment.

After a run of popularity Dahlias began to lose their hold on the public in England between 1860 and 1870. They had never, probably, been very popular as garden plants, their high reputation being largely due to their value for exhibition, and shows were held all over the country.

It was in 1870 that the National Dahlia Society was formed, and this helped to revive the popularity of the flower. The Society and the flower were destined soon to receive an immense impetus, for in 1879 quite a sensation was caused by the introduction of *Dahlia Juarezii*, shown by that fine old florist HENRY CANNELL. This was the first Cactus Dahlia, of a shape hitherto unknown, a flower of brilliant scarlet. It took its type name owing to the colour of the flower bearing some resemblance to *Cactus speciosissimus*, the showy cactus. It was given standing as a botanical species and named in honour of President JUAREZ of Mexico. For the next twenty years or so raisers taking advantage of *D. Juarezii* as a parent brought out hundreds of varieties of Cactus type, flowers of beautiful form with long, narrow, and in many cases twisted florets.

About 1880 the florists' singles were introduced, the parent presumably being *D. coccinea*. This type was raised in Britain, and varieties of it were much favoured by exhibitors.

One other species only is mentioned after the date of 1880 as having played a part in the production of any of the numerous types we have to-day. In The Dahlia: its History and Cultivation, 1903, it is stated that the so-called single Cactus Dahlias were raised by Mr. E. T. LOWE, F.R.S., of Chepstow, from an ordinary single variety, ' Stella Bianca ' by name, crossed with pollen of *D. Merckii*.

D. Merckii is quite distinct from other species. It is a most graceful plant, with finely cut foliage and pretty small single pale lilac flowers with a central disc in which the corollas are dark instead of green. It is a plant which is always much admired in the garden and should be in every collection. I think it probable that this species played a part in the evolution of the dark-foliaged dwarf single varieties ' Lemur ' and ' Little Othello,' both of which have dark centres similar to *D. Merckii*. This is a characteristic of all dark-foliaged varieties.

In 1891 Mr. GIRDLESTONE raised a very dwarf single type which he called ' Tom Thumb '—later changed to ' Mignon.'

Messrs. CHEAL introduced them and used Mr. GIRDLESTONE'S varieties as parents in the raising of many more varieties, seven of which they sent to the big trial of Dahlias at Duffryn in 1913. These very dwarf free-flowering varieties created a favourable impression and four of them received the Award of Merit.

A few years later 'Coltness Gem' of the same type made a sensational entry. It was widely advertised and had a tremendous sale. There may be an impression among some growers that it was the pioneer of the class, whereas it was, in all probability, a seedling from the type distributed all over Europe for more than twenty years. Unlike some types, which have had their "ups and downs," varieties of what have become known as the 'Coltness Gem' type still hold their place in public favour, being used extensively in public parks. The main point to guard against in new varieties is increasing height. I saw a lovely new variety at Rickmansworth Park last year, where it was raised and now grown in many hundreds. It is named 'Masonic Gem,' and it will be seen in the Dahlia trials at Wisley this year. It has all the qualities expected of a variety in its class.

Early in this century the Collerettes were introduced from France and Germany, the Pæony-flowered type from Holland and the Stars by Messrs. CHEAL, Crawley. All these types became popular, but have now given way, to a great extent, to the delightful miniature or small Pæony-flowered type, the family of Decoratives, and Semi- or Hybrid-cactus.

I am told by several of the trade growers that, judging by their sales, the large Decoratives and Semi-cactus hold pride of place with the public. Large Decoratives are certainly very handsome, as are the Semi-cactus, and the habit of most varieties leaves nothing to be desired. Nevertheless, at the risk of being "out of the fashion," I confess to a very definite preference for the smaller-flowered types.

An outstanding characteristic of all the modern types is the habit of the plant with the flowers on stems at least sturdy enough and long enough to show off their value in the garden. Preference for this or that type is one of personal taste, but all have their uses in the garden. It is perhaps this wide range of types which has done so much to popularize the Dahlia. It does not matter how many types and varieties we have, there is always a desire for a novelty, something new, but one wonders in which direction, if any, further development can be looked for. I am often asked by friends if it is possible to get a wider range of colour in the flowers of the dark-foliaged varieties, especially a real yellow. At present the colour range is not wide. For the most part it runs through scarlet, crimson, orange and buff.

The variety 'Peggy Wood' shows the greatest "break," the colour, yellow ground, overlaid cerise, is very beautiful. It is a great favourite with all who see it. In an attempt to raise a yellow Dahlia with dark bronze foliage I made reciprocal crosses last year between 'Peggy Wood' and 'Elma Cook.' The latter is a free-flowering yellow, with of course green foliage. Both varieties belong to the Miniature Pæony class.

The resultant seeds will be sown shortly and I shall be looking anxiously for the result from next mid-July onwards. In plant

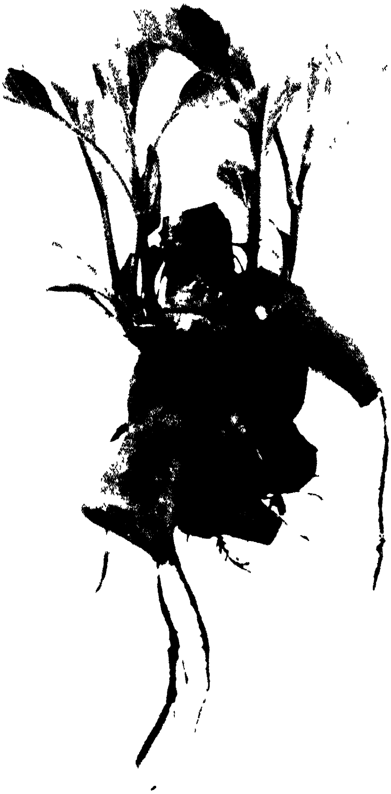

FIG. 45.—DAHLIA ROOT STARTED WITH SHOOTS READY FOR CUTTING.

[*To face p.* 216

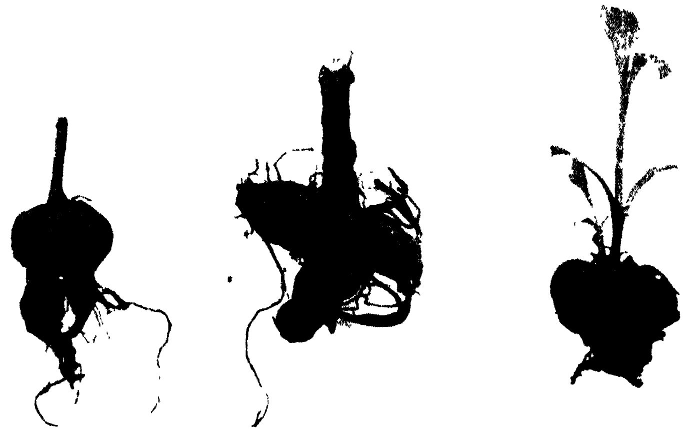

FIG. 46.—DAHLIA ROOTS PREPARED FOR STARTING AND WITH GROWTHS STARTED

breeding, however, though one cherishes a hope for the ideal, it is often the case of " blessed is he who expecteth nothing, for he shall not be disappointed."

Whatever the future developments may be the Dahlia has already reached such a stage that there is justification for making strong claims for it, such, I venture to suggest, as cannot be made for any other flower.

Briefly, these are great diversity in form and size of flower; exceptional range of colour; habit of plant from 1 foot to 8 feet in height; a continuous blooming period longer than any other garden flowering plant.

It is suitable for almost any position in the garden, in town or country; excellent as a cut flower, providing blooms are cut in early stages of development, and lastly, it is cheap to grow, and its cultivation in the garden is of the simplest.

PROPAGATION.

Although Dahlias demand little in the way of skilful cultivation outdoors, propagation may not be understood clearly by all who wish to grow them, and judging by this large audience there is no questioning the increasing popularity of Dahlias.

They are readily increased in several ways, the methods being by seed, cuttings, grafting, and division of tubers. Seed is a cheap and easy way of raising plants. Most seedsmen offer seed of the various types. The method of raising is identical with that given to most half-hardy annuals. The seed is sown in February or March in heat, the resultant seedlings pricked off when ready into boxes, or potted singly into small pots and given fairly warm moist conditions till the end of April, when they are gradually hardened off in cold frames ready for planting outdoors early in June.

Where the object is to raise plants true to type and colour, vegetative propagation is essential, for it must be remembered that the Dahlia does not reproduce itself true from seed.

I have referred briefly to raising new varieties from seed when the object is to obtain new varieties. Trade growers and a few amateurs raise thousands of plants annually in the ceaseless quest for novelties. Their work is reflected each yéar by flowers of several hundred varieties being submitted to the Joint Dahlia Committee of the Royal Horticultural Society and National Dahlia Society. Any variety which is deemed worthy, and an advance on existing varieties, is selected for trial at Wisley. This means that three plants are sent during the following spring to Wisley and grown on trial. This is a severe test and relatively few of those selected as cut flowers prove worthy of an Award of Merit or even Highly Commended as a garden plant. The same Committee acts in the selection and the final judging.

Anyone wishing to keep up to date with new varieties should try to see the trials during August and September. They are well worth a visit.

The usual method of propagation is by

Cuttings.

The hundreds of thousands of green plants sent out by trade growers—usually in May—are from cuttings struck in February and March.

A very small quantity, specially ordered, are grown from pot roots, or even from divided ground tubers.

A start is made with healthy tubers taken from their winter quarters from about the middle of January to mid-February. Where large numbers of cuttings are required the earliest date is chosen.

Tubers are placed on a propagating bed, closely packed, where a bottom heat of about 70° and a top temperature of 55° to 60° may be obtained and retained. Temperatures 10° lower than these are advisable at the start, gradually rising to the maximum at the end of a fortnight.

The tubers are surrounded with a light soil mixture—old potting soil will do well. The tops of the tubers may be left exposed, but are better lightly covered with fibre. No water should be given for the first ten days or so, but actually the first watering should be given when tubers begin to throw up shoots, and then only to those tubers showing growth. Top growth is an indication that root action has also begun, and until this takes place it is unwise to give water unless the soil below the tubers has become very dry. Tepid water only should be given. In private gardens tubers are more often than not packed into boxes for starting. Where a propagating bed is not available the boxes may be placed on pipes, and if these are in double rows it is often possible to arrange this without undue inconvenience as in a " started " peach house or vinery.

Where no such provision is possible the boxes will have to be placed on stages or even on the floor of the house. This will mean much slower rooting and starting into growth. Under any conditions, favourable or otherwise, there is practically certain to be some irregularity in the starting into growth of some varieties; furthermore, some varieties will produce cuttings freely while others are shy in this respect. Usually the small-flowered types produce more cuttings than the large decoratives. Some tubers produce shoots in clusters, while others throw shoots singly from eyes round the crown.

Similar difficulties may have to be met for striking cuttings as for starting the tubers. The trade grower must obviously have ideal conditions for mass propagation. This is provided for by a similar propagating bed to that used for starting tubers. Cuttings are generally inserted singly in thumb pots and plunged in the bed. While it is possible to root cuttings without the aid of bottom heat, the process will be very slow and the percentage of successes not high.

Again the hot-water pipes will meet the difficulty well, and failing the propagating bed, no better place can be found. I have seen many thousands of cuttings rooted in boxes over pipes and the percentage of failures has been almost negligible. Where boxes are used they should be about 7 inches in depth. This will allow for a few inches of material into which to plunge the cutting pots, which can be of sand, fibre or even ashes. A few days before the first batch of cuttings is ready a sufficient number of 2½ or 3 inch pots, washed clean inside and out, should be filled with equal parts of sifted loam and coarse sand. Plunge them into the boxes and water thoroughly. If more pots are prepared after each batch of cuttings has been inserted, the soil will be warmed—an important point— in readiness for the next lot of cuttings.

Cuttings may be taken off when about 3 inches in length, and inserted about 1 inch, either singly, or several round the edge of the pot.

The way in which cuttings are taken and prepared may vary according to circumstances. Where a few plants only of each variety are required, they can be taken off with a heel or small piece of old tuber attached. By the latter system it is obvious that the number of cuttings obtained will be limited to the number of shoots springing from the tubers. If a large quantity is required, it is important when taking cuttings to leave some " eyes " or axil buds below the point at which the shoot is cut off. These eyes will break out into fresh growth, and if the same rule is followed in taking the cuttings a large number can often be obtained from each tuberous root. Prepare cuttings for insertion by cutting them with a sharp knife just below a joint, afterwards removing the bottom pair of leaves. These cuttings are inserted as taken from the tuber. Before inserting the cuttings surface the soil in the pots with sand, and after insertion settle the cuttings in by watering, again using water slightly warmed.

No glass covering is required, as Dahlia cuttings root much better with full exposure to the air of the house. They must, however, be shaded from sunshine and damped over daily.

It usually takes about three weeks for the cuttings to root, and when ready they should be repotted into 3½ or 4 inch pots. If possible slight bottom heat should be given until the plants have rooted through the soil, after which cooler conditions will be best, eventually transferring them to cold frames at the end of April and hardening them off ready for planting out into flowering quarters at the end of May.

I referred to grafting as a means of increasing a stock. This system is rarely adopted now in view of the ease with which cuttings are rooted. Nevertheless, finer plants are obtained in the same space of time. It might well be experimented with for those varieties which are known to make very small tubers. Briefly the object of grafting is that any spare tubers, without growing eyes, may be used as the " stock " on which cuttings are grafted. These single tubers are potted singly into 4 inch pots leaving sufficient of the tuber exposed on which to graft the cutting of any variety desired. If tubers are potted when cuttings are ready the grafting can be done at once. A very sharp knife is essential. " Cleft " grafting is the system employed, and tying in must be done with care, using wide strands of raffia. The pots are plunged in slight bottom heat in a case kept fairly close, but air must be admitted each day to expel moisture. A rapid and satisfactory union of the stock tuber and scion "cutting" will largely depend on the maintenance of a balance between sufficient moisture and dryness while in the case. It takes about three to four weeks to form a satisfactory union; the plants are then removed from the case and treated in the same way as plants from cuttings.

Division of Tubers

This is the simplest way of increasing a stock of plants and for the amateur without glass is practically the only way. The number of plants obtainable will be limited; the actual number will depend mainly on the quantity of individual tubers to each root. While quite dormant it is not possible to divide with absolute certainty that each divided piece will have an eye, but with experience there should be few failures.

I saw a bed of sixty plants of one variety last year, made from about a dozen roots; there were two blanks only. The tubers were taken from store at the end of April, divided, and planted out in their flowering quarters.

This procedure has much to recommend it for the amateur with no facilities for starting tubers. The tubers are buried about 3 to 4 inches below the surface of the soil. The soil is gradually increasing in warmth by this time, which generally means that root action will begin, and that shoots will be showing through the soil early in June. These plants will begin to flower at least as early as plants put out from spring-struck cuttings.

Where a greenhouse or frame is available in which to start the roots this is advisable, a start being made about the end of March. When shoots are ½ to 1 inch long the crowns can be divided by carefully cutting off each tuber bearing one or more shoots. The tubers are then potted into 4 or 5 inch pots or boxed and grown on in greenhouse or frame. In this way plants will be ideal for planting out at the end of May.

CULTIVATION

I have already mentioned that cultivation is of the simplest. It presents few problems and is of a routine character.

The situation for such a sun-loving plant should if possible be an open one. In partially shaded or enclosed positions plants are apt to grow taller than the normal height of the variety. They do not object to exposed positions, as instanced by the displays in large parks and nurseries where they are often fully open to winds. In most private gardens it is possible to give them ideal conditions with some shelter from winds.

With regard to soil, the Dahlia certainly enjoys a deeply dug

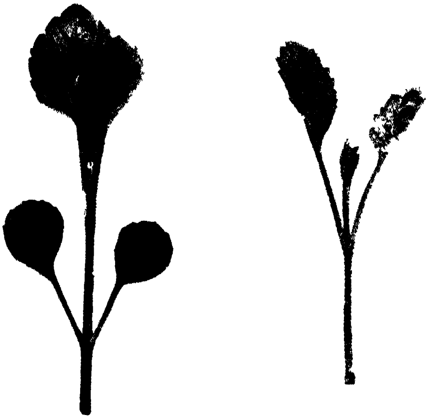

FIG. 47. DAHLIA CUTTINGS READY FOR INSERTION

To face p. 220

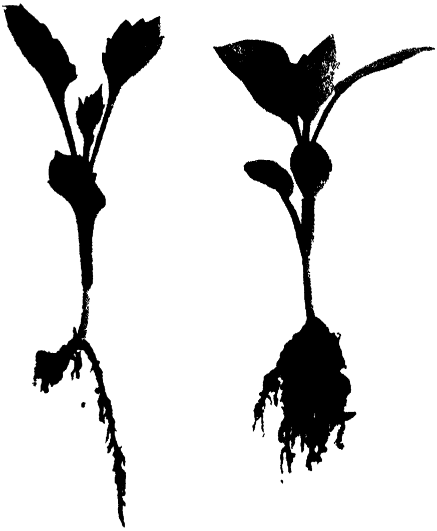

Fig. 48. Dahlia cuttings rooted and ready for potting

medium of sandy loam, but it is true that it will grow in almost any soil. The ground should be double dug during winter, and left rough till spring, when forking over will bring it to a good tilth for planting at the end of May.

I do not advise digging in manure unless the ground is very light and poor, in which case a moderate amount may be given. Where huge blooms of the Decorative and Semi-cactus types are required for exhibition it may be necessary to give generous treatment, but I have in mind flowers for a garden display, not for exhibition. A lot of manure will defeat the aim in view: that of providing the plant with a moderate amount of foliage and a quantity of blooms.

If lime is required, give a dressing in spring at the rate of 6 oz. to the square yard.

For garden displays Dahlias are often given too much space. This should mainly be governed by the type of Dahlia. Strong Decoratives and Cactus will require 4 feet. Small Decoratives and Pæony-flowered, Collerettes and Stars 2½ to 3 feet, and the bedding types 1½ to 2 feet. The effect desired is generally a mass of bloom, and this can best be obtained by close planting.

When planting, if the soil is on the heavy side, it will be a great help if some light compost containing a little bone meal can be given to each plant. Plant deep enough to allow a shallow saucer-like depression around each plant; this will be helpful when applying water. Plant firmly, and if the weather is warm and dry water each plant; this will further help to settle the soil around the plants. Beyond keeping the soil free from weeds and the surface stirred with a small hand cultivator there is nothing much to be done for a few weeks. In warm weather, give a good watering once a fortnight and an occasional spraying with water in early evening will be beneficial.

STAKING

This is an important routine job and should be done intelligently, according to the vigour of the plant. I strongly object to seeing the garden made an eyesore by the use of ugly stakes. In the early stages of growth quite a small stake or cane is sufficient. Neat hazel stakes or straight prunings of plum trees are excellent. These should be obtained in autumn, and tied in bundles to dry during winter.

Later bamboo canes will be suitable for the moderate growing types. One stake will be sufficient for the majority of plants, to which the growths are looped. Occasionally it may be necessary to use three canes to a plant. These are arranged in a triangle, and pushed into the ground obliquely, close to the base of the plant, thus widening at the top. Strong tall growers will, of course, require stronger stakes, especially when planted in exposed positions, but even with these I advise the smaller stake in the early stages of growth.

The hall mark of good staking is reached by ensuring the safety of the plant from damage, while maintaining its natural character, and the invisibility of stakes when the plant is fully developed. The popularity of the dwarf bedding type is largely due to the fact that the effect is seldom marred by stakes, and of course a saving of time and expense are factors not to be overlooked.

FEEDING

As previously mentioned I am not in favour of incorporating a lot of farmyard manure in the soil. I am, however, strongly in favour of feeding the plants at the right time, which is when they have made growth and are coming into bloom. This will apply to plants growing in most soils, but particularly to those in poor soils.

It is always safe to give waterings with weak liquid manure, and at least one, and possibly two applications of artificial manure. A suitable mixture would be bone meal, superphosphate and sulphate of potash, in the proportion of 4 oz., 2 oz. and 2 oz. respectively to the square yard.

For large blooms for exhibition, a weak application of blood manure may be given at the latter end of June, and at fortnightly intervals (1) bone meal and sulphate of potash ; (2) bone meal, superphosphate and sulphate of potash ; (3) ditto, at the rate given above.

Mulching the beds at the end of June with peat moss will keep the soil cool and conserve moisture.

THINNING.

This is a much debated point among Dahlia growers. Thinning is not necessary on plants grown for garden display or for cutting for the house. For exhibiting in competitive classes it is essential when applied to large-flowering types. Furthermore, many growers recommend a certain amount of thinning for these types for the garden. The nature and extent of the thinning will depend largely on the object in view. Growers desirous of exhibiting large Decoratives, and aiming at blooms 10 to 12 inches across with proportionate depth of petal must feed and thin drastically. This may mean thinning to not more than five main shoots and removing all laterals as they appear, thus obtaining five show blooms and no more. Something far less drastic is to reduce the plant to five or six main shoots and remove the top pair of laterals or perhaps two pairs on each shoot. The lower shoots on each main stem would be left to provide a succession of blooms after the flowers on the main shoots have been cut. A third recommendation is to thin the plant according to its habit, but generally, apart from special exhibition purposes, when thinning is done at all, it should be in such a way that enough growths are left to produce flowers to the end of the season.

The removal of faded flowers or seed pods is of course essential. If this is neglected, it will check growth, and cause a premature end to the flowering season.

LIFTING AND STORING.

In mild localities the Dahlia generally lasts in bloom till the second week in October before being cut by frost. Last year it was the last week in the month, but striking an average it is about the middle of October. This means at least three months continuous blooming.

A fine dry day should be chosen for lifting. Cut the plants down to within 6 or 9 inches of the soil and lift the roots carefully with a fork. Remove the soil from around and among the tubers, label them, and dry thoroughly before storing. Varieties differ considerably in size and mass of tubers.

The reason for this is not certain, but there is evidence that the exceptionally free bloomers rarely make good tubers. Varieties which readily come to mind as very free flowerers, and which correspondingly make very small tubers, are 'Helly Boudewyn,' the most wonderful white Dahlia ever raised, 'Beechwood White,' 'Elma Cook,' 'Cintra' and the old 'Brentwood Yellow.' To ensure getting a stock of shy tuber-formers some of our trade growers annually grow a number in small pots, where in the restricted space they make normal healthy pot roots. It is only in this way, I understand, that a stock is maintained of some sorts. To return to the storing. After a moderate drying, any which have not made good tubers should be packed in boxes of sand, peat or ashes, and stored in a frost-proof shelter. The larger tubers will not necessarily need covering if the winter store is suitable. The tubers should be placed stem downwards to prevent the possibility of moisture settling at the base of the stem and perhaps causing decay. This is the most vital part of the tuber, as it is here that the dormant eyes are formed for producing next year's shoots. Next to the luxury of a glasshouse or store in which just sufficient heat can be obtained as is necessary, there is no better place than a cellar for storing. Any building or room, provided that it is dry and that the temperature is about 40 degrees, is suitable. Where there is the slightest risk of frost the tubers must be well protected : a good covering material is ashes.

I have also seen the garden frame used with great success. The tubers were placed on dry leaves and deeply covered with the same material. In the spring they came out perfectly dry, with not a damaged tuber. Tubers in store should be examined periodically. Should any show signs of damp, often indicated by grey mould on the tubers, the roots should be dusted with lime or lime and sulphur. An occasional inspection may save disappointment later.

EVERGREEN VACCINIUMS.

By A. T. Johnson.

The Vacciniaceae, so closely allied to the Ericaceae that some botanists have included them in that family, comprises a large genus of shrubby or almost tree-like plants which has its representatives in most parts of both hemispheres. But of the species in cultivation by far the greater proportion are confined to the northern half of the world, and as most of these inhabit cold moorland regions it is not surprising to find hardy deciduous species predominating. However, the evergreen members of the family constitute an attractive group which does not fail to appeal to anyone interested in such shrubs, and if, coming as they do from climates usually less rigorous, they are not, as a whole, blessed with such immunity to frost as one would desire, they are generally hardy enough for most gardens.

For a full appreciation of Vacciniums it may be necessary to be equipped with that peculiar susceptibility to their subtle charms which renders their allies among the Gaultherias and the like so fascinating to many of us. At all events, we find them pleasant little shrubs to have about our more open woodland tracks where, in a free, non-limy soil containing humus, the evergreen species are engaging at all seasons of the year, while several of them, in addition to an attractive foliage of great diversity, are distinctly ornamental in flower and fruit.

An outstanding Vaccinium which excels in all these features is *V. glauco-album* (fig. 52), a native of the Himalaya (9,000 to 10,000 feet) and a shrub of remarkable beauty at all seasons. Amply furnished with medium green, oval pointed leaves up to 2 inches in length, with their undersides of a vivid bluish whiteness, our old specimen of this choice species is now 4 feet high and some 5 feet in width. In the later spring 3-inch racemes of rosy-white cylindrical blossoms are borne at the terminal leaf axils, and the delicate beauty of these is enhanced by the large crystal-white bracts which adorn the ¼-inch corollas. These flowers are succeeded by round berries the size of currants, the purple blackness of which is entirely hidden by a blue-white bloom. Ripening in early autumn, the fruits of *V. glauco-album* will remain on the bush, untouched by birds and immune to all but very severe frost, until the following spring. In the grey light of a winter day they are singularly striking, their blueness gleaming with a luminous quality and associating with the tint of the leaves and slightly reddened twigs with the happiest effect. We have found this fine shrub capable of enduring up to 20° of frost, and then it may not suffer more than slight injury to the extremities, but I think it needs shelter from cutting winds.

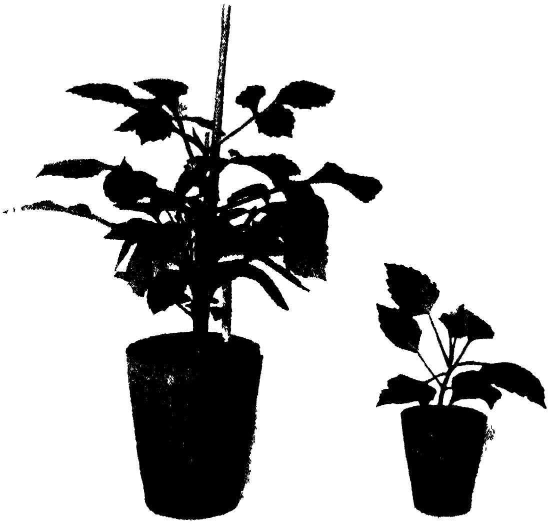

FIG. 49. DAHLIA CUTTINGS POTTED AND (ON LEFT) READY FOR PLANTING.

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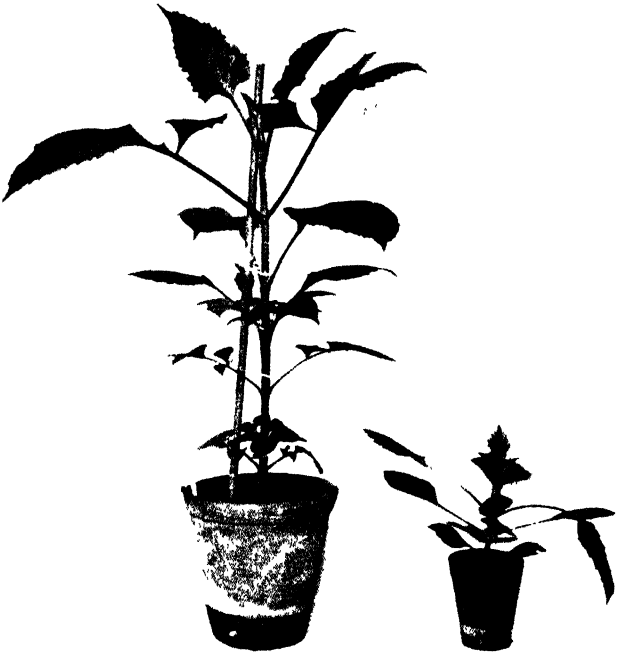

FIG. 50. DAHLIA CUTTINGS POTTED AND (ON LEFT) READY FOR PLANTING

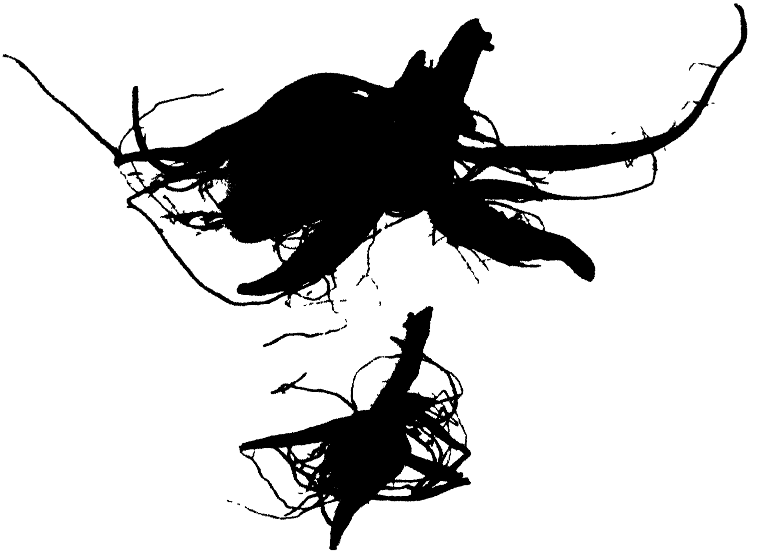

FIG. 51. ROOTS OF DAHLIA LIFTED FOR STORING.

[*To face p.* 225.

Close to the foregoing in garden value is *V. Mortinia* (fig. 53), a fascinating shrub of about the same height, but more inclined to a diffuse lateral habit, especially when grown in semi-shade, or when much exposed to buffeting winds. But this Vaccinium, like many others, even though it may remain compact and lowly for years, has a way of shooting up in a single season slender whippy wands perhaps twice as tall as itself. Even *V. Delavayi*, usually so dumpy, will indulge in this odd sprightliness after spending years of life in settled-down sobriety. Grown merely as an evergreen, *V. Mortinia* would earn its place, for the prettily feathered branches, red in the younger wood, are closely beset with little ovate leaves of a full-toned green which in winter often assumes a bronzy hue. The fresh spring shoots are enlivened by delicate shades of amber and rose and the cylindrical flowers (in May) which throng the twigs are a clear pink. Being mostly borne on the underparts of the branches these flowers lose a little in effect. But, notwithstanding, a plant in full bloom is a very charming object, especially if it is so placed that it is nearly on a level with the eye, and in such a position the glossy red, edible berries which follow them will of course be more noticeable.

Coming as it does from equatorial regions (in Ecuador) *V. Mortinia* might be suspected of tenderness, and it is "not hardy at Kew" (BEAN) or at Wisley. But we have never seen it injured, save slightly at the soft tips, and it is grown in many gardens where the winters are anything but kindly. A plant of lofty elevations (10,000 feet), *V. Mortinia* affords a striking proof of the fact that the altitude of its natural habitat may be of greater significance in estimating a plant's hardiness than latitude. To some extent one may ascribe the reliability of *V. padifolium* to the same fact, for this, though indigenous to Madeira, grows on mountains of considerable height. A sturdy, erect and leafy shrub, *V. padifolium* (fig. 54) is said to reach 8 feet, but our specimen is only little more than half that stature and grows very slowly. Though only semi-evergreen in some gardens it rarely loses any of its leaves with us, but those leaves, ovate, up to 2 inches long and a bright glossy green, are often tinted with bronze in winter. Comparatively large bell-like flowers, pale yellowy-green, clouded and lined with purple, are borne freely about midsummer and succeeded by ½ inch, round plum-black fruits covered with a blue bloom. Not a distinguished species, but one that will not be passed without notice when in flower or fruit.

V. bracteatum (fig. 55) we value as an autumn bloomer. It has made a bushy growth of 2 to 3 feet in our garden, but promises to nearly double that stature. The dark red branches—crimson when young—are well furnished with medium green glossy ovate leaves with narrowly pointed ends and up to 2 inches or more in length. The bluntly cylindrical white blossoms, carried in racemes of 2 inches, are accompanied by pale green leafy bracts, and as these racemes are freely produced the plant puts up an attractive show, which usually extends from about July to the first November frosts. This Vaccinium, which was first introduced from China over one hundred years ago, appears to be quite reasonably hardy, but I have not yet seen the red fruits it is reported to yield.

Between *V. moupinense* and *V. Delavayi* there appears to be close affinity. Both are cobby little shrubs of 1 to 2 feet, densely crowded with small and leathery deep green leaves, more or less oval in shape and with a round apex. But *V. moupinense* may be distinguished from the other by the wider spacing of the leaves, and these are usually without the notch that dimples the blunt ends of those of *V. Delavayi*. The urn-shaped flowers of *V. moupinense* (in May) are a lustrous red-brown and yield dark plum-purple berries which are round and about the size of small peas. There seems to be considerable difference of opinion as to the colour of the blossom in DELAVAY'S Vaccinium, but in the plant we grow the rather tubby little urn-shaped corollas are ivory-white, usually flushed with red, and the berries are scarcely distinguishable from those of *V. moupinense*. As flowering and fruiting shrubs this pair may be comparatively negligible in garden value, but there is a charm about their box-like foliage, and the sombre green of *V. Delavayi* in particular affords a telling setting for the young shoots which adorn the branches in spring with tippets of bright red and primrose.

Another species which gives a pretty effect in spring with its tender growths is *V. ovatum* from the North Pacific coast of North America, whence it was introduced by DOUGLAS over a hundred years ago. The first specimen we planted of this Vaccinium is now about 8 feet high and looks like growing taller. An erect shrub with red-purple young wood and glossy apple-green leaves of leathery texture up to 1½ inch long and half as wide, *V. ovatum* makes a cheerful evergreen. But it is at its best in late summer when bearing its racemes of rosy-white bells which are large enough to be effective and produced in quantity. Only sparsely, however, does it bear its dark plum-red berries, which ripen to a black-purple. *V. ovatum* is not indestructibly hardy, but it has never been seriously injured with us.

V. Myrsinites, a lowly spreading shrub which might be taken for a Pernettya, has not been one of our successes tried as a woodland undershrub, for which purpose it seems suited; and another species from South-east United States, *V. crassifolium*, has found our winters equally distasteful. This semi-prostrate shrub of 6 inches or so has a superficial resemblance to *V. Vitis-idaea*, but the thick tough leaves are smaller and narrower than those of the Cowberry normally are, and, like the younger wood, they are veneered with a reddish-bronze. Rosy-red bell-shaped blossoms are borne in the later spring followed by black berries, but neither of them have we yet seen. Also of a lowly creeping nature are *V. fragile* and *V. Nummularia*, the former coming from West China, the latter from Northern India, and both of them are far from being winter-proof in our garden. *V. fragile*, a loosely built, slender shrublet, usually under a foot high but with a reputation for going taller, is invested in leaf and branch with that hairiness which one earns to regard as a danger signal. It has borne flesh-pink urn-shaped flowers in our garden and produced a few of its round black berries, but it is too often on the replacement list to be considered a permanency.

V. Nummularia gets on better, but since it has its terminal shoots snubbed almost every spring it has never risen to more than 6 inches. However, it makes some amends for this by running freely underground, and with such protection as *Gaultheria procumbens* and *Cornus canadensis*, with which it has mingled, it manages to flower annually Distinguishing features of *V. Nummularia* are the brown bristles which clothe the young wood, the blunt, broadly oval, leathery, almost stalkless leaves, much reticulated, thick textured, recurved at the margins and glossy green, and the rose-pink flowers. These flowers, which appear in May, are narrowly egg-shaped and carried in short racemes near the tips of the branches. The round berries, which we rarely see, are plum-black. In spite of its susceptibility to frost, *V. Nummularia* must be given a place high up among the best of garden Vacciniums, for where it does even moderately well it is a charming little shrub for a moistish humus soil, where it can be given space to ramble at will.

Our native *V. Vitis-idaea* belongs to the same class of carpeting plants, but I think it needs more openness than the foregoing demand. Indeed, I would always give it full exposure, provided moisture were not lacking. A creeping shrub, usually of about 9 inches, with many box-like leaves up to 1 inch in length, dark green and shining, the Cowberry makes a dense mass of growth. Rose and white bell-shaped flowers are produced in May and succeeded by bright holly-red fruits of which the birds are rather too fond. But *V. Vitis-idaea* varies considerably in stature and size of leaf (there are both major and minor forms) as it does in colour of blossoms. Thus we have one robust kind in which the flowers are pure white, but this, presumably an exotic, has not yet set any fruit. *V.* × *intermedium*, a natural hybrid between *V. Vitis-idaea* and the Bilberry (*V. Myrtillus*) found wild in Staffordshire, we have not grown. It is said (BEAN) to " favour " both its parents with a leaning towards the Bilberry in habit, to be semi-evergreen and to yield rosy-pink bell-shaped blossoms and violet berries.

V. Dunalianum stands apart from all others in our modest collection as a shrub of 6 feet, and it is described as greatly exceeding that stature. With a number of purple-barked branches rising erect from the base and leaning outwards in an elegant fashion, this Sikkimese species makes an ornamental evergreen, rather sparsely provided with oval-lanceolate leaves as much as 4 to 5 inches in length, the apices of which are drawn out into long slender points - a very distinctive feature. White bell-shaped flowers are carried in axillary racemes in early summer, but our plant has not yet produced berries. Not a plant for any but the mildest counties, and our dealings with it can only be regarded as experimental.

A few other Vacciniums which we grow, but which are not yet fully established, include several under number and *V. retusum* and *V. pubicalyx*. *V. retusum*, growing to at least a foot, comes from Sikkim and seems quite hardy. Its rigid, hazel-brown, downy branches are closely furnished with broadly-elliptical, leathery, pale green leaves up to 1 inch long, their upper surfaces being reticulated. This species, Mr. W. J. MARCHANT tells me, bears rosy crimson-tipped bells in terminal racemes. *V. pubicalyx*, from Yunnan, is reputed to reach 5 feet, and its thin erect growths indicate by their vigour that such a height will quickly be attained. The leaves of this species, thin but tough, are 1 to 1½ inch in length and lanceolate with long drawn-out tips giving the plant a look of dainty elegance. This foliage may, it seems, be partly shed in severe winters, but it is persistent with us and in the cold weather is usually a soft purple hue. The flowers, carried in axillary racemes, are said by Mr. MARCHANT to be rose-flushed white.

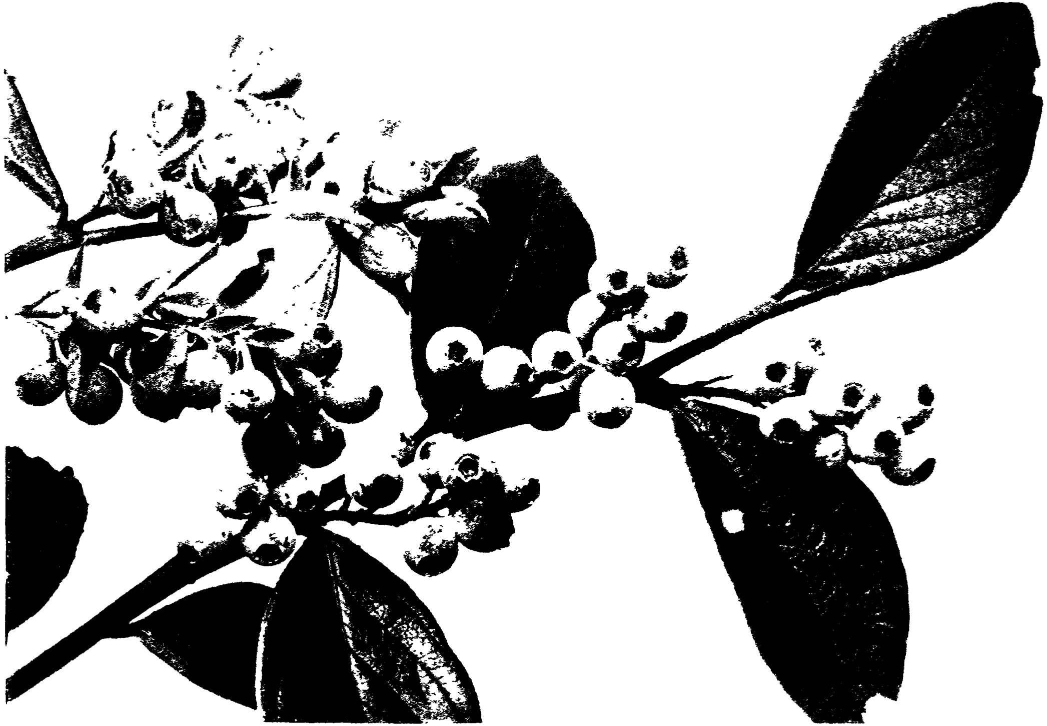

FIG. 52.—VACCINIUM GLAUCO-ALBUM

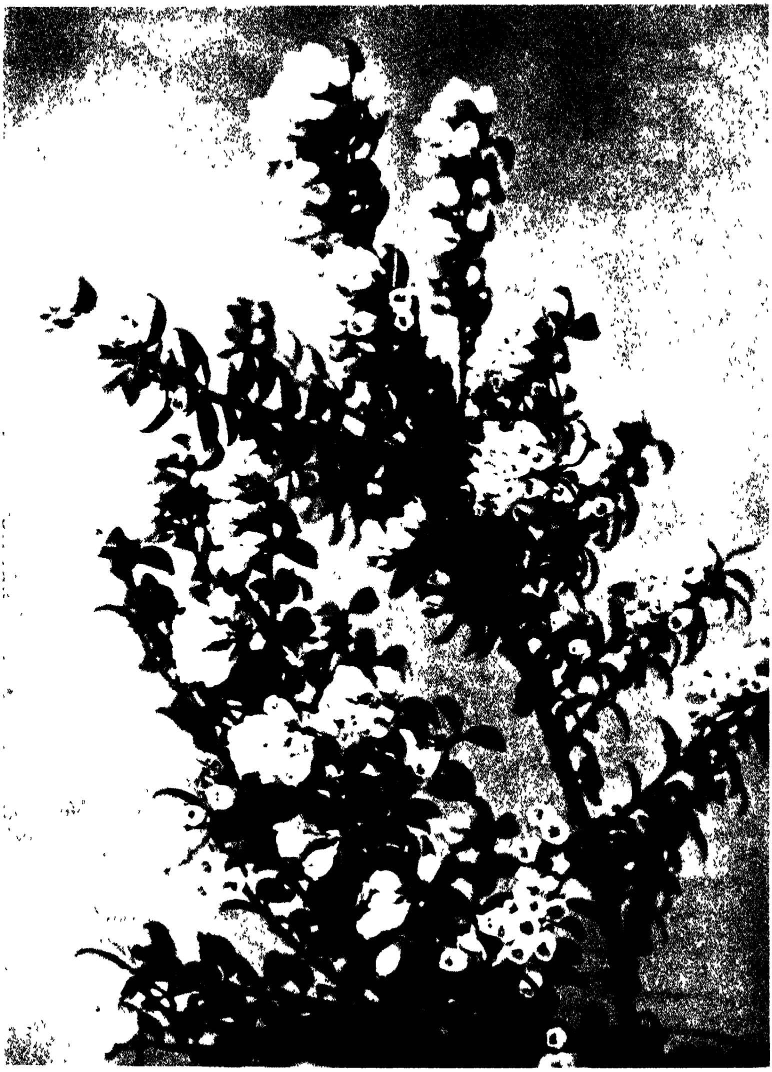

FIG. 53. VACCINIUM MORTINIA.

[To face p. 229.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Asphodelus acaulis. A.M. March 7, 1939, as an alpine house plant. The flowers are almost stemless and are produced from the rosette of linear fleshy leaves. They are crimson-rose with a brown median streak on the perianth pieces, and about 2¼ inches in diameter. Native of the Middle Atlas Mountains. Shown by Mrs. Robert Lukin, Lockram House, Goddard's Green, Nr. Mortimer.

Cymbidium × 'Janette' var. 'Memoria Mrs. A. McBean.' F.C.C. March 21, 1939. Undoubtedly one of the finest Cymbidiums yet raised. The spike bore eleven large flowers, each over 5 inches in width, the broad sepals greenish-cream with pink veins, the petals cream-colour with soft reddish shading, the labellum white with red-brown markings. The result of crossing *C.* × 'Joy Sander' with *C.* × *Alexanderi.* Raised by Messrs. McBean, Cooksbridge.

Dendrobium dicuphum album. A.M. March 21, 1939. Although received from Australia under the name *Dendrobium bigibbum album*, this plant is clearly not that species. The semi-pendulous raceme bears many white flowers, which are tinged with green in the centre and have a green spur. Exhibited by Messrs. Sanders, St. Albans.

Freesia 'George Washington.' A.M. for cutting. March 21, 1939. This variety now shown by Messrs. G. H. Hageman, Heemstede, Holland, was given **F.C.C.** after trial, and is described in JOURNAL R.H.S., **62,** p. 222.

Gladiolus alatus. A.M. March 21, 1939. From T. T. Barnard, Esq., Wareham. A small species for the cool house, producing three or four short, ribbed leaves and an arching inflorescence bearing six or seven scented flowers. The three upper perianth-segments are broad and undulate, the posterior hooded, the lateral spreading, in colour a greyed tint of orange (Horticultural Colour Chart 12/2). The lower segments are much narrower, banded in the throat with dull sulphur-yellow. The species was figured in 1802 at t. 586 of the Botanical Magazine.

Laeliocattleya × 'New York,' Dell Park var. A.M. March 7, 1939. A very showy hybrid, obtained by crossing *Cattleya* × 'Maggie Raphael' with *Laeliocattleya* × 'Aconcagua.' The spike bore a couple of flowers, with pure-white sepals and petals, the labellum rich purple with crimson shading and having a bright yellow centre. Exhibited by Baron Bruno Schröder, The Dell Park, Englefield Green, Surrey.

Lycaste Skinneri var. 'Snow Queen.' A.M. March 7, 1939. A seedling raised in the garden of Sir Jeremiah Colman, Bart., Gatton Park, Surrey. Although no definite record of its parentage exists, the Committee decided to classify the plant as a variety of *Lycaste Skinneri.* While closely resembling the variety well known as *L. Skinneri alba magnifica,* it is, in fact, a purer albino, for there is very little trace of the yellow colour usually present on the crest of the labellum. It is certainly a valuable addition to this popular genus.

Magnolia Dawsoniana. A.M. March 21, 1939. From M. P. Williams, Esq., Lanarth, St. Keverne. Seeds of this species were collected by E. H. Wilson in Western Szechwan at altitudes between 6,000 and 7,000 feet in 1908 and 1910, but none of the resulting plants flowered in this county until 1936. It forms a small, deciduous tree with coriaceous, lustrous green leaves. The flower is formed of nine to eleven segments, the larger inner ones being elliptical, 4 inches long by little over 1 inch wide. The colour is the palest rose blush, with a suffusion of fuchsia purple (Horticultural Colour Chart 28/3) on the outside of the flower.

Mitriostigma axillare. A.M. March 7, 1939. From Messrs. L. R. Russell, Windlesham. A handsome South African evergreen shrub of moderate size with spreading branches bearing glossy, elliptical-lanceolate leaves of deep green. The delightfully fragrant, creamy-white flowers are clustered in the leaf-axils of short, lateral branchlets. A very good figure drawn from one of the earliest plants to flower in this country appears at t. 4987 of the Botanical Magazine, under the name *Gardenia citriodora.*

Narcissus 'Grace Moffat.' A.M. March 21, 1939, as a variety for exhibition. A handsome Incomparabilis variety (Division 2a) with flowers 4½ inches in diameter, well poised on 16-inch stems. The canary-yellow, broad, overlapping, rounded, smooth perianth segments were just over 1¾ inch long and the outer ones were nearly 1¾ inch broad. The marigold-orange cup-shaped corona was about ¾ inch long and about 1⅜ inch in diameter at the mouth. Raised and shown by Major G. H. Johnstone, Trewithen, Grampound Road, Cornwall.

Narcissus 'Penvose.' A.M. March 21, 1939, as a variety for exhibition. An attractive bicolor Incomparabilis variety (Division 2b) with flowers just over 4 inches in diameter, well poised on stout 22-inch stems. The creamy-white broad, overlapping but rather pointed segments were about 1⅝ inch long. The deep lemon-yellow corona was trumpet-shaped, with a frilled, recurved margin, and just about 1½ inch long. Raised by the late P. D. Williams and shown by M. P. Williams, Esq.

Odontioda × 'Pauline' var. 'Glory.' A.M. March 7, 1939. This attractive hybrid bore an arching spike of 11 flowers, of an uncommon reddish-brown colour, the labellum with a broad white apex. The result of crossing *Odontioda* × *Leeana* with *Odontoglossum* × 'Miguelito.' Exhibited by Messrs. Stuart Low, Jarvis Brook.

Potinara × 'Dorothy' var. magnifica. A.M. March 7, 1939. A beautiful hybrid in which the well-formed flower has an orange ground, almost entirely covered with soft ruby-crimson ; the labellum has a frilled margin, and is rose-tinted. The result of crossing *Brassolaeliocattleya* × *maculata* with *Sophrolaeliocattleya* × 'Prince Hirohito.' Exhibited by Baron Bruno Schröder.

Prunus cerasifera nigra. F.C.C. March 21, 1939. From Lionel de Rothschild, Esq., V.M.H., Exbury, Southampton. A very desirable form of the purple-foliaged Cherry Plum, with rich, claret-coloured foliage and very numerous flowers. The expanding buds are phlox pink (Horticultural Colour Chart 625/2), the fully opened flowers a very pale tint of fuchsine pink (627/3).

Prunus 'Pandora.' A.M. March 21, 1939. From Messrs. Waterer, Bagshot. A hybrid stated by the exhibitors to have been raised from the cross *P.* 'Beni-higan' × *P. yedoensis*. The short-stalked single flowers are of medium size and very pale rosy blush.

Ranunculus calandrinioides. A.M. March 21, 1939. A white-flowered Buttercup from the Middle Atlas. The glaucous, undulate, narrowly ovate leaves are about 7 inches long, 1½ inch broad; the flowers over an inch across are borne singly on stems rising rather above the foliage. Shown by F. C. Stern, Esq., F.L.S., Highdown, Goring-by-Sea.

Rhododendron × 'Amalfi.' A.M. March 7, 1939. Shown by Lionel de Rothschild, Esq., V.M.H., as a hardy flowering shrub for the woodland garden. A cross between *Rhododendron calophytum* × *R.* × 'Cornubia' with medium-sized, compact, spherical trusses of about twenty funnel-shaped flowers about 2¼ inches diameter by 1¾ inch long, approaching carmine rose (B.C.C. 621) towards the tips of the corolla lobes shaded to white on the tube, which is spotted dark red with a crimson splash at the base within. The leaves, up to 7 inches long by 2¾ inches broad, are more or less oblanceolate, obtusely pointed, glabrous, dull green above and paler beneath.

Rhododendron × 'Eureka.' A.M. March 21, 1939. A cross between *Rhododendron arboreum* and *R. Hookeri*, shown by Lionel de Rothschild, Esq., V.M.H., as a hardy flowering plant for the woodland garden. The spherical trusses, about 5 inches wide and deep, comprise about fifteen or eighteen narrowly funnel-shaped flowers, each up to 2 inches deep by 2½ inches across, blood-red, speckled dark brown within. The obtuse, elliptic-oblong, slightly mucronate, glabrous leaves are about 6 inches long by 2 inches broad, dull green above, paler below.

Viburnum Tinus, Exbury var. A.M. March 21, 1939. From Lionel de Rothschild, Esq., V.M.H. The Laurustinus has been grown in Britain for more than three centuries, and is one of the most useful evergreen shrubs for southern gardens. The Exbury variety is a vigorous seedling with red shoots bearing elliptical-ovate, slightly lustrous leaves, narrower than those of var. ***lucidum***. The flowers are of good size, flushed with pink in the bud, and are borne in large terminal and smaller axillary cymes.

Viburnum Tinus hirtum. A.M. January 12, 1937. From F. C. Stern, Esq., F.L.S. A fine form raised from seed collected in Algiers by Mr. E. A. Bowles. It differs from the preceding in being more densely leafy, with large, broadly ovate, coriaceous, hairy leaves up to 4 inches long and larger flowers in compact, terminal cymes.

THE AWARD OF GARDEN MERIT.—XLVIII.*

By F. J. Chittenden, F.L.S., V.M.H.

244. Magnolia parviflora.

Award of Garden Merit, September 23, 1935.

Magnolia parviflora is a native of Japan and Corea, and like so many plants of those countries it is better suited by soils rich in peat or decaying leaves than by the more loamy soils that suit *M. Soulangeana* so well. Like others this species is rather impatient of root disturbance or damage, and is best planted in May.

M. parviflora is not a vigorous grower, but it eventually makes a large bush or even a small tree with rather open branches. The cup-shaped flowers appear on the leafy shoots first in May and follow one another a few at a time until August. The petals are pure solid white, about 2 inches long, with which the numerous crimson stamens contrast in a pleasant and striking fashion, placing the flowers among the prettiest, although not the largest, in the genus. They are borne on stalks 1 inch to 2½ inches long and to this beauty add the further grace of fragrance. The slender branches bear oblong or oblong-obovate leaves up to 4 or 6 inches long with rounded bases and abruptly pointed tips on hairy petioles about ¾ inch long. The leaves are dark green above and smooth, greyish and downy below.

M. parviflora is hardy, though, like so many otherwise perfectly hardy trees, the young growths are apt to be cut by late frosts.

It is figured in the Botanical Magazine, t. 7411.

245. Aronia arbutifolia erecta.

Award of Garden Merit, June 7, 1936.

The two or three species which form the group Aronia are at times put as a section of the genus Pyrus, but it has been generally agreed to divide this great agglomeration of species into several genera, and therefore we give the now accepted name. They are bushes, natives of North America, with simple, shiny leaves, simply toothed on the margin, and, like those of the Pear, are rolled in the bud. Their flowers, produced in May and June, are white, of moderate size, the floral leaves smooth, or bearded in the middle; the five styles are joined at the base;

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* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title Some Good Garden Plants. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the Journal R.H.S., vol. 63, pp. 190, 246, 448 and 546; 64, p. 134.

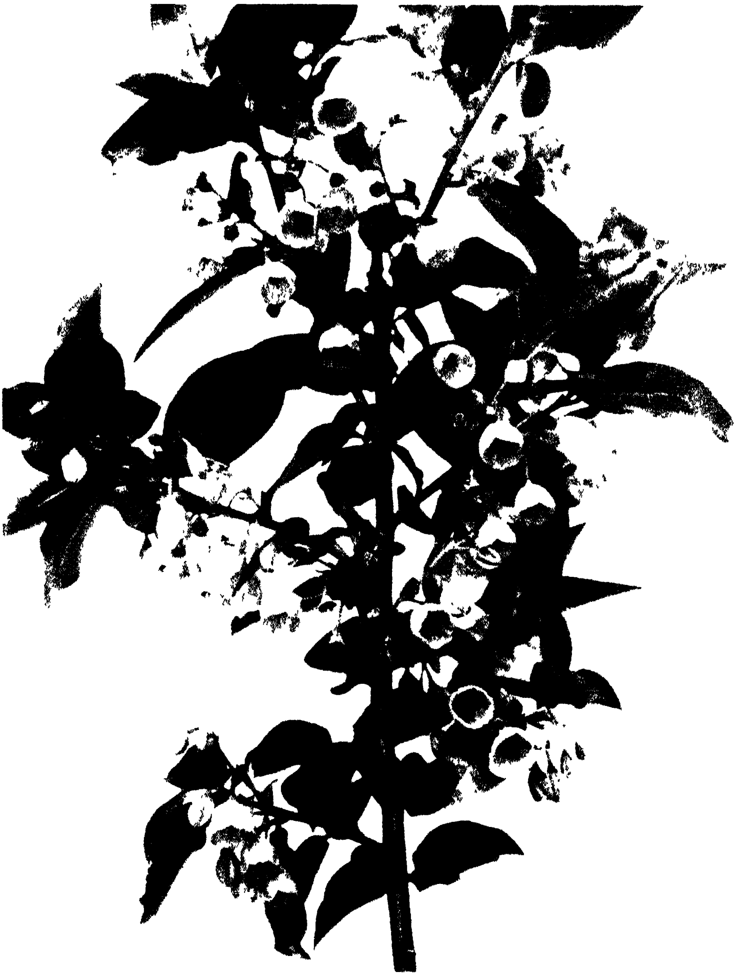

FIG. 54 VACCINIUM PADIFOLIUM

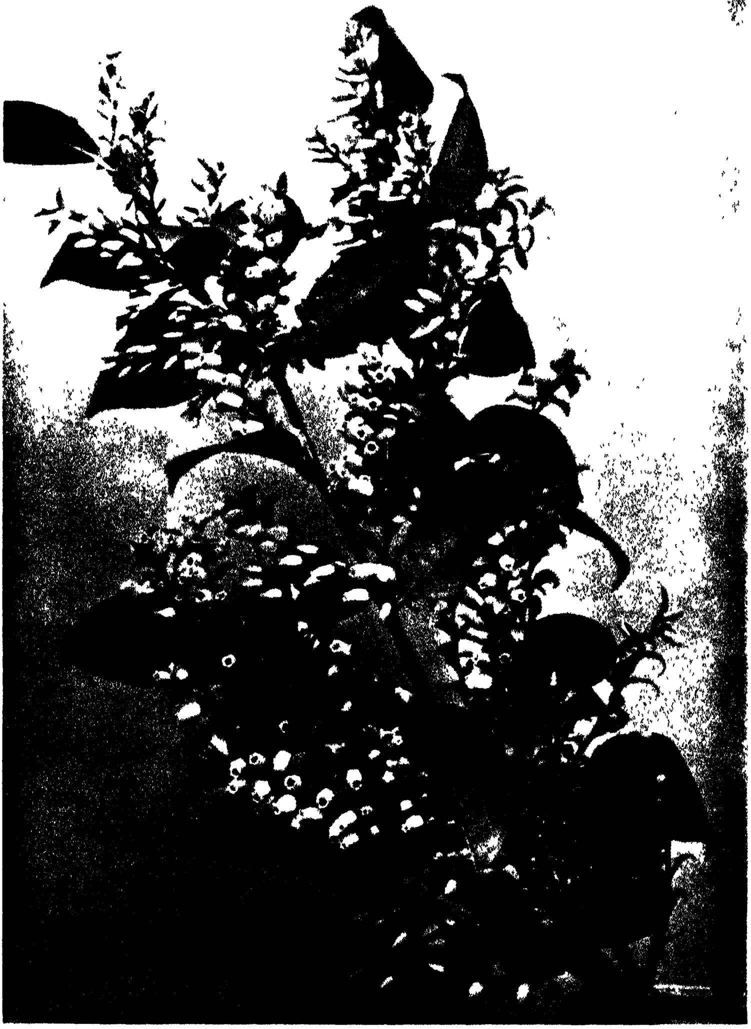

FIG. 55 VACCINIUM BRACTEATUM

[To face p. 233

unlike the Pear the fruit has very few stone cells, and very thin walls to the five cells. *Aronia arbutifolia* has fruits about ⅜ inch in diameter, scarlet or dark blood-red when ripe, while those of *A. melanocarpa* are shining black, and thus easily distinguished from *A. arbutifolia*, but there are other marks of distinction, such as the brownish or whitish hairy instead of the smooth or black hairy shoots of *A. arbutifolia*.

The importance of the shrub from the garden point of view is the brilliant scarlet of the autumn foliage, a well-grown bush, about 4 or 5 feet in height, of the variety *erecta* being a veritable column of fire in October every year, and lasting well. It will flourish in any soil and is good even in a poor sand, but it needs full sun.

A. arbutifolia was introduced to our gardens well over a hundred and twenty years ago, and it was figured in the Botanical Magazine, t. 3668.

246. RHODODENDRON 'LODER'S WHITE.'

Award of Garden Merit, June 1, 1931.

Those who can grow Rhododendrons (i.e. those who have a lime-free soil) but little space, must needs wonder which of the vast number of species and hybrids to choose. Hardiness is one criterion, beauty another, reliability of flowering a third, good habit, comely foliage, not too great eagerness to grow very early, or indeed to flower so early that frost is almost bound to catch the flowers, and so on, all must come in for consideration before choice is made.

A few reliable Rhododendrons have already been given in these notes and now another hybrid is added. It has been in cultivation for many years, for it received an **A.M.** in 1911 when shown by Mr. REUTHE, so that it is well tried. It flowers in late May, so that there is less danger of serious damage to the flowers and foliage than with many. It has large and shapely trusses of large flowers, at first delicate pink, becoming as they age pure white, and the petals are somewhat crinkled. The plant is of good habit, making a rounded bush if planted so that it is not crowded by others. It flowers freely, as the illustration of the fine plant in Mr. HUGH WORMALD'S garden at East Dereham which appeared in the R.H.S. JOURNAL, **59**, p. 283, well shows. It has thus all the attributes which fit a Rhododendron for a place in any garden large enough to give it room. It is not, of course, a plant for the tiny garden, for it eventually makes a large bush 10 or 12 feet high and 8 or 10 feet through, but it is one for a first choice where a large bush can be accommodated.

There is perhaps some doubt as to its parentage. Our first record of it says the parents are "said to be" *R. Griffithianum* and *R. arboreum album*, and that may well be. At any rate a combination of these two will give a picture of what may be expected if one plants *R.* 'Loder's White.'

GARDEN NOTES.

Anthyllis Hermanniae.—At the Conference on Ornamental Flowering Trees and Shrubs held in April, 1938, I was called upon to speak on the subject of Dr. STOKER'S paper on shrubs for rock gardens.

My impromptu remarks contained an error.

I criticized Mr. BEAN for stating in his well-known book on Trees and Shrubs that *Anthyllis Hermanniae* was "of no floral beauty." My memory was entirely at fault. Mr. BEAN, on the contrary, rightly praises this small shrub as "flowering freely" and as being "very pretty."

I do not know how my mistake arose. On the same page of Mr. BEAN'S book a description of *Anthyllis Hermanniae* is followed by an account of *Aphananthe aspera*, which he says has "little or no flower beauty." Possibly a hasty glance at this page made me think that this derogatory phrase referred to the shrub of the preceding paragraph. If so, it was a very careless mistake.

I have already apologized privately to Mr. BEAN, but I should like to take this opportunity of apologizing publicly in the R.H.S. JOURNAL.

If this note calls the attention of a wider public to the merits of this charming little shrub I shall feel that some small atonement has been made for an inexcusable error.—*E. S. Lyttel.*

Banksia integrifolia.—The storms and frosts of the winter 1938–9 have caused great havoc in many gardens where rather tender plants have been planted. Among the striking trees which have succumbed is a very fine example of *Banksia integrifolia* in Mrs. HEXT'S wonderful garden at Trebah, nr. Falmouth. The tree, perhaps the finest of its species in the county, was planted about fifty years ago and had reached a height of 64 feet, and 24 feet through, and the stem was 5 feet 6 inches in circumference about a foot from the base. It had perhaps reached old age, for some of the roots were beginning to decay, though, if the soil had not been saturated by the heavy rains at the time, it might have withstood the heavy gale of January 23, 1939, as it had done so many before. It was planted in a south-east aspect and was surrounded by large trees of the evergreen oak, *Quercus Ilex.* Many of the specimens of *Banksia integrifolia* which had been planted were destroyed by the disastrous frosts of 1916–17 as the records of that severe winter in our JOURNAL show.

On the growth of Lilium auratum virginale.—In January, 1933, a bulb of *Lilium auratum virginale* of no extraordinary size was planted under the shade of Pines in lime-free soil which had had no other special preparation than deep digging and the incorporation of leaf mould. In the same summer it gave a stem of some four feet. As year followed year the successive stems became taller and taller until, in 1937, one was thrown of the extraordinary height of 11 feet 3 inches, having a circumference at the base of 3¼ inches and carrying a raceme 2½ feet long. As such a stem was considered worth preserving, it was cut off below ground level in October, before, that is to say, the foliage had withered. Last year, 1938, the stem was 9 feet 8 inches in height, 3⅞ inches in circumference, and bore a raceme of 21 inches. The flowers were 9¾ inches in diameter, but the flower stalks were a little shorter than in the previous year. At no time since its planting has the Lily received special treatment other than a yearly mulch of leaf mould.

This occurrence goes to show that, if a stem is left *in situ* for a reasonable period after its appearance from the soil, no great harm results from its removal even though the leaves are still in active function.

Mr. A. GROVE tells me that it is unusual for this Lily to persist for longer than three years in cultivation. I do not think that impermanence is inherent in the plant, but believe that it is due to mosaic disease, a condition to which *L. auratum* and its varieties are very prone. The specimen described is the only survivor of a group of four. The remainder were infected and dug out immediately the symptoms of disease became manifest.—*Fred Stoker.*

Winter damage.—In some parts of the country the weather of the past autumn and winter has resulted in much injury to gardens and even in the death of many plants which hitherto have come safely through the ordeal of winter weather. The actual extent of the damage is only now becoming really apparent and we should welcome information regarding it and the circumstances that seem responsible for it.

The nature of the soil, aspect and exposure have no doubt considerable influence as well as the kind of weather which preceded the low temperatures of December and January, and the actual accompaniments of the low temperature, e.g. wind and snow, will all have played their part.

We hope to be able to give a general account of the effect of these conditions in due course. Already some Fellows have been good enough to send us particulars of damage done, plants that have, perhaps unexpectedly, escaped and so on, and we shall be glad to receive similar particulars from any whose gardens have suffered so as to make the account as complete as possible.—*Editor.*

Gardening in London, and especially the cultivation of evergreens, is undoubtedly subject to obvious handicaps. In recent years, however, judicious experiments and enterprise on the part of the progressive Committees of some of our Square Gardens and of those responsible for our Parks, have demonstrated that Londoners can grow in the open with reasonable, and in some cases with astonishing success, evergreens which may not necessarily prove easy even for their more fortunate country cousins.

Our London garden, little more than 3 miles from Marble Arch, has houses and factories extending in every direction, with buses and motors roaring by continuously. It gets quite its fair share of petrol fumes and grime and fog, yet in spite of this a great variety of flowering evergreen shrubs do well and some of the most successful are those referred to as " slightly tender " or " suitable for mild localities."

Senecio Greyii is one of the best ; nothing seems to go wrong with it in spite of its woolly leaves. Its pale grey colour provides a welcome contrast to the all too sombre shades of the other evergreens and it is a vigorous grower. The pruning necessary to keep the plant shapely supplies delightful foliage for cut flowers—excellent with Carnations, but effective with almost anything.

Another valuable grey bush is *Corokia virgata*. Growing here in the open, it flowers and fruits without fail, yet at Kew it appears to be confined to a wall, and in the Botanic Gardens at Cambridge it has a place in the Alpine House.

Escallonias (*E. macrantha* and *E. langleyensis*) do very well, *E. langleyensis* in particular providing admirable sprays of cut flowers in June—since pruning is always made to serve a double purpose if possible.

Other evergreens which have no claims to tenderness, but which can be relied upon to do themselves credit, are *Olearia Haastii*, *Choisya ternata*, *Viburnum Tinus*, and Bay trees. All these flower cheerfully here every year ; one Bay, now about 16 feet high, is covered with blossom every spring, affording a surprise to those who have thought that a Bay tree is always just " green."

The attractive Muehlenbeckia flourishes exceedingly and has run up a high holly hedge, threatening to smother part of it. In the Scillies it reaches the tree tops, but it does not seem to be grown much elsewhere. Naturally it can be seen at Wisley.

What is probably the most unusual plant to find in London is a fair-sized *Callistemon* (*linearis* ?) growing out in the open in a neighbour's front garden. Its appearance was so striking when in flower that I had the boldness to beg cuttings. Only one of these struck, but numerous young plants have been raised from the previous year's seeds which were found on the cuttings. These little plants are vigorous and healthy and further results are awaited with interest.

London gardens need not be devoid of attractive evergreens : one need not accept the general belief that Privet, Aucubas, Euonymus and Holly are practically the sole varieties of evergreens one should attempt to grow, nor need we tolerate the idea that their general condition of stunted growth, legginess, disease and decay is inevitable. Neglected evergreens look nowhere more deplorable than in a town garden : on the other hand it is just there where attractive and well-grown evergreens are desirable and most prized.—*W. B. Acworth, Shoot-up Hill, N.W. 2.*

BOOK REVIEWS.

"The Garden of Pinks." By L. H. Bailey. 8vo. 142 pp. Illus. (Macmillan, New York.) 12*s*. 6*d*. net.

The author of this work has given us in the above-named volume a comprehensive work, such as one would expect, indeed, from the compiler of the world-famous Bailey's Cyclopedia of Horticulture. I had long looked forward to a popular monograph on this genus, which must be one of the most confused from a gardener's point of view. My guides, so far, had been Williams's The Pinks of Eastern Europe and The Pinks of Western Europe, and my friend Dr. Lemperg's more recent attempt at clearing the muddle existing in the nomenclature of the Dianthi as we know them in English gardens Neither of these three books sufficed for my needs any more than the enumerations of those plants in The English Rock Garden of Farrer or Dr. Clay's supplementary volume on this last work.

In consequence I had been looking forward to the publication of Dr. Bailey's book with great expectation and am, perhaps somewhat unreasonably, disappointed to find that he gives only about half the pages of the work before me to the "Enumeration of Dianthus" and the rest to a section of these plants which I, as a hardy plant grower, do not cultivate.

Bearing in mind, however, the great number of gardeners who are interested in Carnations, Border Pinks, Sweet Williams and the so-called Indian Pinks, I must admit that Dr. Bailey has rendered a great service to horticulture in this carefully compiled work, more especially, perhaps, to the American gardening public, who, on the whole, are less interested in the wild species which we, in England, delight to grow in our rock gardens.

The work before me consists of 135 pages of text, a useful key to the species of Dianthus, and an accurate index.

There is a coloured frontispiece of what we call Indian Pinks, *Dianthus chinensis*, for which the author has coined a new name, "Rainbow-Pinks." This is by the brush of Marion Wrench, whilst the other 45 plates are from freehand drawings by Florence Mekeel, which bring out in plain black and white the essential characteristics needed for identification.

In the introductory chapter the author gives us an insight into his garden and into his workroom and tells us that at the time of writing he had no fewer than 54 kinds of Pink growing in his garden, although these at the moment were resting under a deep blanket of snow. In his workroom he had no fewer than a thousand herbarium sheets bearing on his subject, 175 photographs of living species and 735 index cards for reference. One must allow he had ample material at hand.

The second chapter deals with his "Rainbow Pinks" illustrated with five plates, or even six, if one counts the one illustrating the root-systems of Indian and Garden Pinks. These plates show the evolution of these more or less annual Pinks from the wild plant to the much enlarged forms we know as *D. chinensis Heddewigii* and the immense, wildly slashed *laciniatus* forms.

The following chapter deals with the Cluster-headed Pinks which we, in English gardens, rather tend to neglect, unjustly, I think, for some of the finest and fiercest colours are to be found in the somewhat small flowers of this group. The fourth chapter is devoted to Maiden Pinks, by which we now mean the Pinks of the *D. deltoides* section.

The fifth chapter is devoted to the Cheddar Pinks for which the author has revived the name *D. gratianopolitanus* (Villars), which has three years priority (1789) over the name *D. caesius* (J. E. Smith, 1792) and which shorter name the author rightly suggests would be preferred by gardeners.

The following chapter deals in a general way with Cottage Pinks, under which name we are to understand the Grass, Snow, Scotch or Feather Pinks of old gardens, in fact, the offsprings of *D. plumarius*, *per se*, or in union with almost every other Pink it has met in gardens during the centuries it has rejoiced gardeners with its sweetness.

Then follows a chapter of Carnation Pinks divided into Grenadin Pinks, Marguerite Pinks and Remontant or Perpetual Pinks, which includes the winter Carnations so very largely grown under glass in these days.

Next comes a short summary upon Rock-garden Pinks, which is presently amplified by about 70 pages of text, enumerating many of the species with which we are, more or less incorrectly, familiar in our rock gardens and borders and under which will be found the Bearded Pink, *D. barbatus*, which, in its many garden forms, I had rather expected to find treated separately in the manner of the chapter on Rainbow Pinks.

Of outstanding value between these groups and the species are two chapters by experts, the first by W. E. Blauvelt on "Insect and other Animal Pests of Dianthus," which I found particularly enlightening and wise, and a further chapter on "Diseases of Dianthus," by P. P. Pirone. Everybody who grows Carnations under glass in these days will be grateful to Mr. Pirone for the exhaustive information as to cause, cure and prevention of the many diseases the modern Carnation is heir to. That chapter alone, to my mind, is worth the price charged for the whole work and Dr. Bailey appears to have been very fortunate in the choice of his collaborators.

Of the remainder of the book I can only say that I regret it is not even fuller, and that it leaves me still without the information on several Dianthi I own, or have owned, and which I had hoped to have found in the work now before me.

I looked in vain for *D. haematocalyx*, for instance, and its varying forms that have puzzled me on the mountains of Greece, and the allied forms of *D. arboreus* from the Greek Islands, *fruticosus*, *juniperifolius*, etc. *D. arboreus* itself is described but the *D. fruticosus* cited in the enumeration is related to *D. Armeria* and not the plant I wanted further information about. Although it is mentioned that *D. fruticosus* of the Grecian Archipelago is a smaller plant than *D. arboreus* I had hoped for much fuller information on this species.

However, Dr. Bailey has covered a wide field with great success and considerable distinction and I can thoroughly recommend this book to every lover of the genus Dianthus.

W. E. TH. INGWERSEN.

"Hortus Academicus Lugduno-Batavus. 1587–1937: the Development of the Gardens of Leyden University." By H. Veendorp and L. G. M. Baas Becking. 4to. 218 pp. Ill. (Enschede, Haarlem, 1938.) 6.75 g. bound; 5.75 g. in paper.

This most interesting and valuable account of the development of one of the oldest botanic gardens in Europe, written in English, and illustrated by many charming drawings, is a welcome addition to horticultural literature.

It contains not only the history of the growth of the gardens and an account of how the numbers of species grown increased with the lapse of time, but tells whence many of them came and how they were acquired.

Not only that, but there are biographies of the botanists whose activities led to the initiation and growth of the department of Botany in the University and the garden which was part of that department.

The garden itself dates from 1587 under Professor de Bont, then Pieter Pauw (Pavius after whom Pavia is named) appears, and as superintendent, Dirck Outgaertszoon Cluyt, but not until Charles de l'Escluse was induced to come to Leiden from Frankfort where he had gone in 1588 from Vienna, did the gardens really take shape, and it has been a labour of love lately to restore to the garden the species which Clusius there collected. Then came de Vorst, Florens Schuyl, Seyen, Paul Hermann, Hotton, Boerhaave, the van Royens, Brugmans, Reinwardt, von Siebold, Blume, the two Wittes, de Vriese, as well as others who all played their part as the story tells, in the making and maintenance of this old, interesting, and important garden.

The price of this book is advanced by one-half after April 1, 1939.

"German-English Botanical Terminology: an introduction to German and English terms used in Botany, including plant physiology, ecology, genetics and plant pathology." By H. and E. Ashby, H. Richter and J. Bärner. 8vo. xi + 195 pp. (Murby, London, 1938.) 10*s*.

This book gives a brief summary of the main phases of botany, introducing technical terms on opposite pages in English and German (pp. 1–136). This is followed by an index to the names of many wild and commonly cultivated plants in English, Latin and German in parallel columns arranged in order of families. Then comes an index of common diseases similarly treated, and finally an English Index to terms and names and a similar German Index.

The book thus combines a glossary of terms and names and examples of usage in the two languages.

"Potatoes." By J. C. Wallace. M. of A. Bull. 94. 8vo. 53 pp. Ill. (H.M. Stationery Office, London, 1938.) Paper covers, 1*s.*

This useful Bulletin deals with the farm cultivation of the potato, not with potato-growing on allotments, but the principles involved are the same in both, though with the deeper cultivation and frequently heavier manuring of the garden soil the yields are apt to be much higher in the garden than on the farm.

Perhaps a fuller discussion of the comparative merits of the newer varieties of potato would have added to the value of the Bulletin, and some more definite reference to the virus and wart diseases and the regulations concerning the latter would have been an advantage.

The use of immature seed is recommended, but it seems to the reviewer doubtful whether immaturity *per se* is a factor in increasing yield.

"How to Make a Garden." By Marguerite James. 8vo. 160 pp. Ill. (Woman's Magazine Office, London, 1938.) 3*s.* 6*d.*

This book is intended primarily as an instruction book for women who intend to plan and construct a garden.

A remarkable amount of information for the most part useful and reliable has been collected into this comparatively small volume, and although the sequence is not always very logical, it is on the whole well presented.

More space might well have been devoted to the general principles of planning and greater emphasis laid on the necessity of thinking of design of the garden as a whole before going into details.

Among the specimen plans included is a suggested lay-out for a garden on p. 18. Here the main axial line of the house has been entirely ignored, and the formal garden which forms the principal ornamental feature has been centred on a line mid-way between the two boundary fences instead of being co-ordinated with the house as it should be.

Apart from a chapter on hedges and a keyed planting diagram of doubtful value, very little information has been given as to the arrangement of trees and shrubs for ornamental effect, a subject of particular interest nowadays. The authoress dismisses the subject by saying: "Half the fun of garden planning is in floundering through catalogues," and that the selection of plant material is "a bewildering business. Yes! But how well worth worrying out for oneself!"

However, garden making is a very big subject, and all things being considered this book provides good value for the money, and should prove of service to those for whom it has been written.

J. E. Grant White.

"Gardening in the Shade." By H. K. Morse. 8vo. 181 pp. Ill. (Scribner, New York, 1939.) 10*s.* 6*d.*

After reading this book one is left with the impression that it is primarily intended for American readers at the beginning of their gardening careers.

In Britain, shade, particularly light or half-shade, is not regarded as a problem but as a very desirable asset to any garden, one which, indeed, we are often at great pains to procure. The author hints, however, that American ways are not as British ways. "Gardening enthusiasm grows apace," she writes, "and some day perhaps we in America will become as garden conscious as the English." That day, it may be inferred, is fairly distant if the practice of oiling the leaves of pot plants "to increase their luster" is as general as Mrs. Morse's admonition suggests.

On p. 89 we are told that *Lithospermum prostratum* "is now called *Lithodora.*" But is it? Nearly a century ago Grisebach separated from the Lithospermum aggregate the species *diffusum* (*prostratum*), *fruticosum* and *oleifolium*, and made the group into a new genus which he called *Lithodora*. It was not kept up and, although there have been isolated attempts to restore it, I was not aware that any had been successful.

Many of the illustrations give ideas on informal garden design, but, on the whole, they are pretty rather than interesting.

F. Stoker.

"Hesperides: A history of the culture and use of Citrus Fruits." By S. Tolkowsky. 8vo. 370 pp. Col. ill. (John Bale & Curnow, London, 1939.) 21*s.*

The great importance of Citrus Fruits in modern days needs no emphasis: every fruit shop or wayside barrow shows that the once rare Orange and Lemon are now within the reach of all.

The gradual migration from their home in Western Asia of the numerous members of this family, their entry into Europe, and later into America, is a tale of slow and inevitable conquest as engrossing as any tale of ancient history. This then is the story that M. Tolkowsky has set out to tell us, and it is done with an unequalled wealth of reference and illustration which will for long be a model for similar monographs.

We cannot refer to all the important discoveries in Citrus history which the author has made, it is enough to say that many statements so far accepted as true must now be corrected. As an instance may be given the statement by Gallesio, endorsed by de Candolle, Hehn and others, that the Orange and Lemon were unknown in the Mediterranean until the tenth century. The author produces as witness a remarkable Roman mosaic showing two Oranges, a Citron and a Lemon, and several Pompeian frescoes showing Oranges.

Again, the generally accepted story that the sweet Orange did not exist in Europe before Vasco da Gama's voyage to India in 1497, is shown to be wrong. The sweet Orange was acclimatized in Western Asia and on the Mediterranean shores before that time, having, like the Citron, come by the overland route.

It is very interesting to read that Columbus on his second voyage to America in 1493 took seeds of many Citrus fruits which thrived so well in San Domingo that Oviedo found in the early years of the following century "innumerable trees" growing there.

We must not, however, convey the impression that the author is only concerned in setting right the errors of his predecessors; far from it. With a wide outlook he surveys all sides of life where Citrus fruit may enter; Literature, Painting, Cookery, Medicine and Horticulture are all brought in as evidence, and indeed the work might well be entitled The Citrus Fruits in Human Life.

The writer of this review has long been collecting notes of the fruits depicted in paintings from the Renaissance onwards. M. Tolkowsky seems to have found them all and hundreds besides. We do not find, however, a reference to the Orange on the window-sill of Van Eyck's famous portrait of Jean Arnolfi and his Wife in the National Gallery. This point will interest the author in connexion with his remarks on the Orange trees shown in Herbert and Jan van Eyck's Adoration of the Lamb.

The chapter on the remarkable Orange "mania" of the seventeenth century is of great interest, and from this sprang the cult of Orangeries, without which, at one time, no gentleman's garden, even in England, was held to be complete.

Citrus history begins in China, one thousand years before Christ, and the author ends with the Orangemen of Ulster and tells us why there is an Orange Bay in Chile and one in Newfoundland.

No praise can be too high for the scholarship and far-ranging eye that has produced this remarkable book. It stands alone not only as a history of the Citrus fruits, but as a model to all who propose to write on similar subjects, at once an encouragement and a discouragement!

The book is well printed and the proofs have been most carefully read. We could only wish that the reproductions of the paintings had been a little clearer in detail in some cases.

E. A. BUNYARD.

"A Gallery of Gum Trees." By A. W. D'Ombrain. 4to. 53 pp. Col. ill. (N.S.W. Forest. Comm. Sydney, 1939.) 14*s*. 6*d*.

This is a series of well-executed coloured illustrations showing the habits of several different species of Eucalyptus. The original paintings from which these illustrations were made are the work of Miss Tydfyl Evans. They show no details of leaf form or floral structure nor is the text enlightening on these points. For information of this kind recourse must be had to other books. There is, however, much information briefly given of the habitats and uses, and notes on the broad distinctions to be seen between the different gum trees.

"Gardening as a Hobby." By A. W. Edminster. 8vo. xi + 184 pp. Ill (Harper, London, 1938.) $2.50.

This book deals with the flower garden and with plants for indoor decoration, though there is little concerning the latter. It is written for American gardeners, and after brief chapters on "Location and Colour Harmony," "Soil Preparation and Plant Foods," "Plant Propagation," "Cold Frames and Hotbeds," "Insects and Diseases," chapters are devoted to the various types of decorative plants, but, strangely enough, little is said concerning ornamental trees and shrubs (except roses).

" A Calendar of Garden Colour." By M. E. Stebbing. 8vo. 118 pp. Ill. (Nelson, London, 1939.) 3*s.* 6*d.*

The arrangement of plants in gardens so as to provide colour harmony and colour contrast is an amusement and an art. Here is a book on the subject arranged month by month. Not only flowers but coloured stems and various types of foliage are dealt with. Several of the illustrations are from north country gardens.

" Recent Advances in Plant Genetics." Ed. 2. By F. W. Sansome. 8vo. xii + 412 pp. Ill. (Churchill, London, 1939.) 18*s.*

The author has proved himself an excellent expositor of the science of plant genetics, and we therefore welcome this second edition of the book he wrote in collaboration with Dr. J. Philp, bringing up to date in a compact form the knowledge that is quickly accumulating in regard to his subject.

Dr. Sansome's summary is enriched by many diagrams which help to make the matters with which he deals clearer than any text can do. This is a book for the intermediate and advanced student of genetics whether of plants or animals.

" Lilies for Garden and Greenhouse." By D. T. Macfie. 8vo. 143 pp. Ill. (Collingridge, London [1939].) 5*s.*

This is an excellent book full of practical information about lilies and their cultivation. The book begins by describing the structure of the lily, showing the importance of the basal root formation and explaining the stem roots and their functions. This information is of great importance to the lily grower, for a knowledge of the root growth of the different species will give the grower an idea how deep each lily should be planted. Mr. Macfie goes on to discuss the question of soils, the problem of planting and in what positions lilies should be grown. There is a chapter on cultural routine showing how pests and diseases can be dealt with. In mentioning the use of meta-fuel for catching slugs, he says that its effect is equally fatal to birds ; that has not been my experience nor do the birds seem to be attracted to the meta if it is mixed with bran. The question of disease has been put in the right perspective, for, as he says, as often as not what is thought to be disease is due to weather damage or attacks by insect pests. It is not the usual experience that *Lilium* × *testaceum* is as liable to disease as *L. candidum*, in fact *L.* × *testaceum* seldom gets disease, especially when it is grown where there is lime in the soil.

There is a most useful list of species and hybrids with cultural directions and full of helpful suggestions. The author is rightly enthusiastic about such lilies as *L. Davidi*, *L.* × ' Maxwill ' and *L. giganteum* though giving the height of the latter as 14 to 15 feet seems somewhat too enthusiastic ; *L. Bakerianum* var. *Delavayi* is not nearly so charming as the type and seems more difficult to cultivate. The perennial question of lilies and lime is fully discussed under each species and a list of lilies tolerating lime is given at the end of the book ; *L.* × *tigrinum* will not tolerate any lime nor in my experience will *L. Sargentiae.* A list of lilies for woodland planting is given to which *L. auratum* might have been added. A misprint seen in the book is in the name of *L. Grayi* which is wrongly printed as ' L. Greyii.' The short chapter on propagating lilies might have been expanded, especially that part about propagation by scales.

This book will be found to be useful to every amateur who is anxious to grow lilies and also to the professional gardener.

F. C. STERN.

" Vegetable Cultivation and Cookery." By Eleanor S. Rohde. 8vo. viii + 275 pp. Ill. (Medici Society, London, 1938.) 7*s.* 6*d.*

This differs from most books on growing vegetables by including methods of using them, and by ignoring " artificial " manures, including bone-meal, though shoddy and hoof and horn are mentioned. Hoof and horn are of much more value than the author would have us believe, but no doubt many would disagree in detail with some part of what is said regarding manures, though few would disagree concerning the importance of using all kinds of refuse organic matters.

None of the vegetables grown in England are omitted and several rarely met with are included, e.g., Turnip-rooted Chervil, Hamburg Parsley, Pokeweed, Skirret. The notes on cultivation are generally clear and accurate, but many will find sowing Peas in November less satisfactory than sowing in mid-January and productive of no earlier crops ; but for these sowing-times each must determine according to local climate, and eighteen inches is certainly too close for pea-rows, even for dwarf Peas.

Following the directions for cultivation are notes on the pests and fungi by which the plants are liable to be attacked and there are also general notes on wireworms, slugs and so on. One does not often find it possible to obtain gas-lime nowadays, though it is recommended against wireworms; methylated spirit and bran suggested as a means of dealing with slugs has probably arisen from the erroneous idea that meta-fuel is solidified methylated spirit; a warning that the use of sawdust encourages harmful fungi is also founded on the erroneous idea that all fungi are harmful.

The cookery recipes show what a variety of dishes can be provided without camouflaging the vegetables used in the way some chefs think necessary. Some who value vegetables as food will be surprised at the embargo upon immature vegetables—we are told young vegetables should not be used—how far this applies to beans and peas is not clear, but it is specifically mentioned in relation to carrots and vegetable marrows; we are even told it is necessary to discard the core of carrots. If so, they must certainly be quite mature!

One unusual name occurs—Pea-bean. This we think is no new vegetable, but, so far as can be judged from the description, a long-known variety of climbing French-bean, possibly the one known in France as 'Coco bicolore prolifique à rames' or possibly 'Mangetout sans filet.'

Few names of varieties of the various vegetables are mentioned and an indication of those the author has found best would have been welcome.

Enough has been said to indicate that this is a book with individuality and one likely to be found useful, especially to those who garden alone. A word must be said concerning the excellent line drawings that adorn the book, and also perhaps of the need for a little more care in correcting printer's errors. We have not sought them, but find a family of plants called 'Picoideae' (p. 31), on p. 193 'Pea Thrip,' and on p. 203, "fear of perpetrating disease."

"Chinese Gardens, Gardens of the Contemporary Scene: an Account of their Design and Symbolism." By Dorothy Graham. 8vo. xi + 225 pp. Ill. (Harrap, London, 1938.) *21s.*

The title of this book indicates its contents and intention. The form and symbolism of gardens in China are traced from early times through the various dynasties to the present, and though there is evidence of lack of care in proof-reading, and at times in checking references, the whole story is told in an interesting fashion. The many excellent illustrations are from photographs taken by the author.

"Botany for Fun." By G. H. Browning. 8vo. xii + 176 pp. Ill. (Drummond, London, 1938.) *5s.*

Two children and a kindly uncle discuss plants and their ways, and having read their discussion we have no hesitation whatever in saying that children of an enquiring mind even younger than the reviewer will like this book. What they learn from it will not need to be unlearnt later, and the methods it inculcates will help forward their education in the best way.

NOTES AND ABSTRACTS.

Ceanothus foliosus Parry. By J. R. Sealy (*Bot. Mag.* t. 9540 ; Nov. 1938).—California. Stem with short soft hair, leaves small, margin flat, with sparse hair below. Flowers blue in terminal globular clusters. A wall shrub.—*F. J. C.*

Coelogyne speciosa var. **alba** Lindl. By V. S. Summerhayes (*Bot. Mag.* t. 9539 ; Nov. 1938).—A warm house plant probably from Malaya. Flower salmon or flesh-coloured, lip said to have white middle lobe to the lip, but shown with white lateral lobes and a salmon middle area.—*F. J. C.*

Columnea hirta Klotzsch et Hanst. By T. A. Sprague (*Bot. Mag.* t. 9542 ; Nov. 1938).—Central America. Flowers 3 inches long, scarlet, yellow in throat. A warm house, basket plant.—*F. J. C.*

Compositae, Chinese [Plantae Sinenses a Dre H. Smith annio 1921–1922, 1924 et 1934 lectae. Compositae, 2]. By H. Handel-Mazzetti (*Acta Horti Gotoburg.*, xii, pp. 203–359 ; illust. ; 1938).—This list of determinations of Compositae collected in China by Dr. Harry Smith of Uppsala describes many new species, and gives notes on the synonymy and distribution of others, belonging principally to the genera Aster, Leontopodium, Anaphalis, Chrysanthemum (with a key on pp. 261–262 to species related to *C. indicum*), Artemisia, Senecio, Cremanthodium, Saussurea and Crepis.—*W. T. S.*

Cotoneaster conspicua, A new variety [var. decora] of. By Paul Russell (*Proc. Biol. Soc. Washington, D.C.*, **51.** 183–184 ; Nov. 1938). Under K.W. No. 6400, collected at Gyala, Tibet, in November 1924, Kingdon Ward sent seed from a Cotoneaster represented in a wild state there by both erect and prostrate forms ; it was covered in winter with scarlet berries. The erect form, in a wild state only 3–4 feet, but in cultivation up to 5 or 6 feet high, with leaves ¼ to ½ inch long, ⅛ to ¼ inch broad, was described as a new species, *Cotoneaster conspicua* Comber, in 1936 (Gard. Chron. (3) **99,** 388) from plants raised at Nymans, Sussex.

The prostrate form, raised at Washington, D.C. (U.S.A. Pl. Introd. No. 64253) from seed sent by Mr. L. de Rothschild, has become very popular in Pacific Coast gardens under the name *C. decora*. It forms a dense evergreen mat up to about 7 feet across, and about 2 feet, or occasionally rather more, high, with the main branches prostrate and the lateral branches ascending ; the leaves are elliptic oblong, 5 to 7 rarely 10 mm. (⅕ to ⅖ inch) long ; the solitary flowers have wide-spreading white suborbicular petals 3 mm. long, 4 mm. broad ; the globose or obovoid scarlet fruits are about 9 mm. (nearly ⅔ inch) long. On account of its prostrate habit and uniformly small leaves it has been named *C. conspicua* var. *decora* Paul Russell.—*W. T. S.*

Epimedium and Vancouveria (Berberidaceae), A monograph. By W. T. Stearn (*Jour. Linn. Soc. Bot.*, vol. li, pp. 409–536 ; figs ; Dec. 1938).—For the compilation of this monograph the author has examined herbarium material belonging to many of the chief institutions of Europe, N. America, and China, and has studied living plants cultivated at the Cambridge University Botanic Garden, Kew, and Wisley, and in numerous nurseries and private gardens.

An historical introduction is followed by a detailed analysis of the morphology of these herbaceous plants (pp. 415–426), with particular attention to the size and shape of the petals and the construction of the gynaecium. Notes on the flower pigments have been supplied by Dr. R. Scott-Moncrieff, of the John Innes Horticultural Institution. The author considers the monotypic *Ranzania japonica* to be the nearest ally of Epimedium. Under the heading of Classification previous arrangements are reviewed and Vancouveria is separated from Epimedium, the latter being grouped into two sections and four sub-sections. Details of the present geographical distribution, with the reasons for this and the probable origins of the species, are accompanied by four maps indicating the range of Vancouveria in California, Oregon, and Washington, and the three principal centres of Epimedium in Europe, China, and the Far East. Remarks on the species and hybrids in cultivation are succeeded by an English key to these plants and their forms—an unusual feature in a botanical monograph—and an enumeration of all the species of the two genera with Latin keys for their separation.

Of the twenty-three Epimediums recognized only two are placed in the section Rhizophyllum characterized by a leafless inflorescence, namely *E. pinnatum* (with its sub-species *colchicum*, *Bot. Mag.* t. 4456), from Transcaucasia, Georgia, and N. Iran, and *E. Perralderianum* (*Bot. Mag.* t. 6509), an outlying member of the race from Algeria. The remainder fall into section Phyllocaulon, having foliaceous stems, and therein are subdivided according to the presence or absence of a spur on the petal and the number of leaves borne by the flowering stem. Two species, *E. alpinum* and *E. pubigerum*, are natives of Europe, one (*E. elatum*) of Kashmir, the others ranging throughout China, with the exception of the north-eastern area, to Manchuria, Korea, the far-eastern U.S.S.R., and Japan.

One new species is described—*E. macrosepalum*, from the maritime province of the far-eastern area of the U.S.S.R.—but *E. leptorrhizum* Stearn, from Central China, was published in 1933. The account of each species includes references to descriptions, synonyms, and to illustrations where available, an English description, distribution of the plant, citation of specimens, and remarks. Pages 513–525 are devoted to an account of the hybrids, of which *E.* × *rubrum* and *E.* × *versicolor* and its forms were described by Charles Morren in the mid-18th century, *E.* × *Youngianum* (*Bot. Mag.* t. 3745) was introduced from Japan before 1839, while *E.* × *Perral-chicum* and *E.* × *warleyense* are newly published; the last attractive plant, of which the origin is unknown, is figured.—*B. O. M.*

Fritillaria liliacea Lindl. By W. B. Turrill (*Bot. Mag.* t. 9541 ; Nov. 1938).—Collected in California by Douglas. Flowers nodding (about 8) on a stem about 12 inches long, white with a greenish tinge, anthers orange.—*F. J. C.*

Jasminum polyanthum Franchet. By J. R. Sealy (*Bot. Mag.* t. 9545 ; Nov. 1938).—Yunnan. Likely to be hardy only in milder districts. Flowers in large clusters, red outside, white within, about ¾ inch across, leaves compound with 7 leaflets.—*F. J. C.*

Moraea Carsoni Baker. By B. L. Burtt (*Bot. Mag.* t. 9544 ; Nov. 1938).—Rhodesia, Kenya. Leaves flat, linear, flowers purple with a yellow purple-spotted blotch at the base.—*F. J. C.*

Picea Breweriana S. Wats. By R. Melville (*Bot. Mag.* t. 9543 ; Nov. 1938).—W. North America. Branches slender, pendulous, leaves about 1 inch long, blunt. Cones purplish, narrow cylindrical. Hardy, eventually 90–100 ft. high.—*F. J. C.*

Studies in the Ericales, IV. Notes on Chimaphila, Gaultheria, and Pernettya in Mexico and Adjacent Regions. By W. H. Camp (*Bull. Torrey Bot. Club*, vol. lxvi, No. 1, pp. 7–28 ; Jan. 1939).—*Chimaphila acuminata* (Lange) Rydb., *C. guatemalensis* Rydb., and *C. dasystemma* Torr. are reduced to synonyms of *C. maculata* (L.) Pursh, a variable and widespread plant in the U.S.A. *C. Menziesii* (R. Br.) Spreng. is found to extend into Mexico from California.

In Gaultheria the author regards the shape of the sepals as too inconstant to act as classificatory characters. He distinguishes two groups in Mexico. 1. *Acuminatae*, with a rachis either glabrous, finely puberulent, or rarely (e.g. *Gaultheria Pringlei*) with minute glands. 2. *Odoratae*, with a hairy rachis of which the hairs are gland-tipped.

In the former group *G. nitida* Benth. becomes *G. acuminata* var. *nitida* (Benth.) Camp. Two new species are recognized, *G. Pringlei* and *G. chiapensis*. In group 2 come *G. odorata* Willd., *G. lancifolia* Small, with var. *dulcis* Camp, and *G. Hartwegiana* Loes. New species in this group are *G. Conzattii*, a low shrub not more than eight inches high with racemes of deep pink flowers, var. *mijorum*, in which the rachis and pedicels are without glands, and *G. tacanensis*, a bush up to about 2 ft., again with pink flowers in racemes up to 6 cm. long. Notes on the following species are also given :—*G. hirtiflora* Benth. ; *G. parvifolia* Small ; *G. domingensis* Urban ; *G. sphagnicola* Rich ; *G. glandulifera* Small ; and *G. costaricensis* (Donn. Smith.) Small.

Three new species of Pernettya are described—*P. mexicana*, *P. obovata* and *P. Tomasii* ; and one is transferred from Gaultheria—*P. hirsuta*.

A hybrid, *G. Conzattii* × *P. mexicana*, fairly abundant on Cerro de San Felipe, Oaxaca, is described as × *Gaulthettya oaxacana* Camp, a compound name over which *Gaulnettya* of Marchant has priority.—*B. O. M.*

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV

Part 6

June 1939

6-7-3

FORTHCOMING EVENTS.

CALENDAR.

ON June 6 (12 noon to 7.30 P.M.) and 7 (10 A.M. to 5 P.M.) there will be a Fortnightly Show in combination with the Iris Society and its Show (the Iris Society's Show opens at 1 P.M. on June 6). The third competition for a Sewell Medal (see January JOURNAL, p. 31) will be held; on this occasion only one medal is offered, and that for an amateur's exhibit. Entries for this competition must be made on special forms obtainable from the Secretary, and the completed forms must be received not later than by the first post Wednesday, May 31.

At 3.30 P.M. on June 6 there will be an Iris discussion, which will be opened by Miss L. F. Pesel speaking on "Iris Colours—Harmony and Contrast."

A lecture will be given at 3.30 P.M. on June 7, under the auspices of the Institute of Landscape Architects, by Mr. Christopher Tunnard on "The Modern Movement in Landscape Architecture."

From 2 P.M. to 4 P.M. on June 7 and 8, a demonstration will be given at Wisley (weather permitting) on the Summer Pruning of Shrubs. Fellows wishing to attend the demonstration should inform the Director of the Gardens beforehand, mentioning the day.

The second Fortnightly Show of June will be held in the New Hall on June 20 (12 noon to 7.30 P.M.) and 21 (10 A.M. to 5 P.M.). At this show the class competitions of the London and South of England Viola and Pansy Society's Show will also be staged.

In the Old Hall at the same dates and times the Cactus and Succulent Society will hold its Show.

On June 20, at 3.30 P.M., a lecture will be given by Sir Arthur Hill, K.C.M.G., F.R.S., V.M.H., on "Pelargoniums."

The Lily Group will hold a Question and Answer meeting on June 20, at 4.30 P.M., in the Restaurant of the Old Hall (see below, p. 247).

On the second day of this Show, June 21, an informal talk will be given at 3.30 P.M. on " Panama Plants," illustrated by water-colour drawings, and described by Mrs. Lindsay Smith and Sir A. W. Hill, K.C.M.G., F.R.S., V.M.H.

On June 23 (1 P.M. to 7.30 P.M.) the British Delphinium Society will hold its Show in the New Hall, and the National Sweet Pea Society will hold its Show in the Old Hall. Particulars of these two Shows may be obtained from their respective secretaries ; for the Delphinium Show—Mr. A. J. Moir, 3 Warwick Road, Thornton Heath, Surrey; for the Sweet Pea Show—Mr. S. J. Glanville, 3 Royal Avenue, Chelsea, S.W. 3. Fellows' tickets admit to these Shows.

On July 1 the Lily Group will visit the Garden of Mr. W. Hutchinson at Finchampstead, and the Nurseries of Messrs. W. A. Constable, Ltd., at Burnham (see p. 247).

The first Fortnightly Show of July will be on July 4 (12 noon to 7.30 P.M.) and July 5 (10 A.M. to 5 P.M.), at which Lilies are sure to be prominent. The following classes for Lilies for Amateurs will be open for competition :—

Class A.—6 species and/or hybrids of Lilium, 1 stem of each, cut or on plant.

First prize, £2 ; Second, £1 10s. ; Third, £1.

Class B.—1 stem of Lilium cut or on plant.

First prize, £1 ; Second, 15s. ; Third, 10s.

At the Shows on July 4 and 5 and July 18 and 19 a Banksian Medal is likewise offered for award to the amateur who exhibits, at either one of the Shows mentioned, the best hybrid Lily which has not received a Certificate of Preliminary Commendation, an Award of Merit, or a First Class Certificate beforehand. All entries for this medal must be made on forms obtainable from the Secretary, and be in his hands not later than by the first post on the morning of the Show, but earlier if possible.

At 3.30 P.M. on July 4, in the Lecture Room of the New Hall, there will be a discussion on the Lilies exhibited. Members of the Lily Group and Fellows are invited to attend. The further arrangements for the Lily Group are given later.

At 7 P.M. on July 4 members of the Lily Group and their friends will dine together in the Restaurant of the New Hall. Intimation of the desire to attend this dinner should be sent to the Secretary as soon as possible.

At 3.30 P.M. on July 5, in the Lecture Room of the New Hall, the informal talk on " Some Plants in the Show " will be given by Mr. T. Hay, C.V.O., V.M.H.

On July 18 (12 noon to 7.30 P.M.) and July 19 (10 A.M. to 5 P.M.) there will be a Fortnightly Show at which there will be two competitions :

I. A Lily Competition for amateurs, the classes of which are as follows :—

Class A.—3 hybrids of Lilium, 1 stem of each, cut or on plant.
First prize, £1 10s. ; Second, £1 ; Third, 15s.

Class B.—1 stem of Lilium cut or on plant.
First prize, £1 ; Second, 15s. ; Third, 10s.

II. The annual competition for the Clay Challenge Cup for the best-scented Rose. The particulars of the Clay Cup competition will be found on p. 32 of the January JOURNAL. Entry forms for these competitions are obtainable from the Secretary.

The National Carnation and Picotee Society will hold its Annual Show in the Old Hall on July 18 (1 P.M. to 7.30 P.M.) and 19 (10 A.M. to 5 P.M.).

At 3.30 P.M. on July 18, in the Lecture Room of the New Hall, Mr. A. A Fincham will lecture on Fuchsias. Members of the Fuchsia Society are invited to attend.

On July 19, at 3.30 P.M., in the Lecture Room, an informal talk on "Some Plants in the Show" will be given by Mr. W. M. Campbell.

On July 19 and 20 (2 to 4 P.M.), weather permitting, a demonstration will be given at Wisley on the Summer Pruning of Fruit Trees. Fellows wishing to attend this demonstration should inform the Director of the Gardens beforehand, mentioning the day.

GLADIOLUS COMPETITION IN AUGUST.

Will Fellows and Associates kindly forgive the misprint on the back of their tickets where the date of the Gladiolus Competition is given as August 9. This date should be August 15. Full particulars of the competition will be issued in the July JOURNAL.

LILY GROUP.

There will be a meeting of the Lily Group on June 20, at 4.30 P.M., in the Restaurant of the Old Hall. Members will be invited to put questions on any matter connected with Lilies, Nomocharis or Fritillaries, and arrangements will be made for the questions to be answered as far as possible.

On July 1 visits will be made to the Garden of Mr. W. Hutchinson at Finchampstead, and to the Nurseries of Messrs. W. A. Constable, Ltd., at Burnham.

Particulars of the visits are obtainable from the Secretary.

On July 4, at 3.30 P.M., in the Lecture Room of the New Hall, there will be a discussion on the Lilies exhibited.

In the evening of July 4 at 7 o'clock a dinner will be arranged for the members of the Lily Group and their friends in the Restaurant of the New Hall. The Secretary will be pleased to receive applications for tickets for the dinner at an early date.

AUTUMN SHOW.

As already announced, arrangements have been made to hold an Autumn Show in Earls Court on Wednesday, Thursday and Friday, September 13, 14 and 15, and as this event does not appear on the tickets nor in the January JOURNAL calendar, Fellows and Associates are particularly asked to make a note of it in their diaries so that it may not be overlooked. The schedules for the Show should be available early in July.

EXAMINATIONS.

The Preliminary Practical Examination for the National Diploma in Horticulture will take place at Wisley from June 12 to 16, and the Final Practical Examination for this Diploma will take place at Wisley from June 20 to 30.

RHODODENDRON CONFERENCE.

The Rhododendron Conference, which the Society is holding in conjunction with the Rhododendron Association, will take place in 1940 on May 7, 8 and 9, and arrangements for the programme are progressing satisfactorily. The programme will contain such subjects as: Rhododendrons in the wild, geographical distribution, and story of discovery of Rhododendrons; Modern Rhododendron Hybrids and their uses in the Garden; Propagation; Greenhouse Rhododendrons; Hardy hybrid Rhododendrons, their cultivation in country and town; and Rhododendron species in a cold situation, etc.

Concurrently with the Conference there will be a three-day Rhododendron Show with competitive classes. Visits to gardens will also be arranged.

Fuller details of the programme will be published from time to time in these notes, but Fellows interested in Rhododendrons are asked to notify the Secretary so that their names may be registered.

THE SEVENTH INTERNATIONAL CONGRESS OF GENETICS.

The Seventh International Congress of Genetics will be held in Edinburgh, Scotland, from August 23 to 30, 1939, and any Fellows who are interested in this subject, and who desire to take part in the Congress, are invited to apply to the General Secretary, Professor F. A. E. Crew, F.R.S., Institute of Animal Genetics, West Mains Road, Edinburgh, 9, Scotland.

WISLEY IN JUNE.

In June the floral trials planted within the shelter of the Hornbeam hedges not far from the entrance gates are one of the most interesting and beautiful features of the Gardens.

In the early part of the month Lupins make their display, accompanied by the tall Bearded Irises in the ground opposite to the Peach wall, and the Paeonies beside the Pear orchard. To the latter notable additions have been made this year in the form of the large collection gathered together by the late Major G. CHURCHER of Haywards Heath, although in the present season these cannot be expected to give of their best after transplanting. Later in June we have Delphiniums, Sweet Peas, Heucheras, and Pyrethrums, and about the end of the month Border Carnations, Pinks, Sidalceas, and last the Roses begin their flowering season. These trials and collections enable visitors to compare the old with the latest varieties under similar conditions, and thereby to gain an opinion as to the merits of the new-comers. They also form some very gay patches of colour in this part of the Gardens, making an impressive effect *en masse.*

In the beds adjacent to the Alpine house are further collections of brightly coloured flowers—Cistus from the Mediterranean regions, a large selection of the numerous Helianthemum hybrids now available, and the brilliant South African Gazanias in yellow or copper tints, which will continue to bloom until the end of summer.

Within the Alpine house the plants include many representatives of such genera as Campanula, Nierembergia, Oxalis, Saxifrages of the *S. Cotyledon* group with long sprays of blossoms, besides such notable plants as *Phlox mesoleuca, Phyteuma comosum, Ramondia serbica* and *Weldenia candida,* to mention only a few.

On the Rock Garden there is an even greater variety of suitable plants, amongst which may be mentioned the prostrate *Anacyclus depressus* from Morocco, Aethionemas, species of Dianthus, Phlox, Primula and Saxifraga, the richly coloured *Geranium subcaulescens. Thymus Serpyllum coccineus,* and *Lychnis Arkwrightii, Iris Kaempferi* and *Mimulus* ' Whitecroft Scarlet ' by the waterside, and in the shady crevices of the rocks *Ramondia Myconii* with its cool lavender flowers boldly held up to view.

The clumps of Lilies in the Wild Garden are an annual source of interest and admiration ; the first of these in June being the reddish *Lilium umbellatum, L. rubellum,* and the soft yellow *L. Szovitsianum* rising to 6 feet in height, long established in this part of Wisley. Many of the Candelabra section of Primula are grown here too, especially the tall yellow *P. helodoxa, P. Beesiana, P.* ' Red Hugh,' and the fragrant *P. alpicola* in its various coloured forms. Rhododendrons and Azaleas lend colour and scent to the woodland, and here also is that very handsome evergreen American shrub *Kalmia latifolia,* and the Madeiran *Orchis foliosa* with dense heads of rich purple flowers.

Amongst all the shrubs in Seven Acres at this time *Buddleia alternifolia* probably takes pride of place for its pale mauve weeping sprays of bloom, but the Escallonias are just as prolific, the Pyracanthas perhaps more so, and the wealth of the Cotoneasters promises a good crop of berries in the autumn. *Genista cinerea* at the edge of the Heath Garden is a shrub of the highest quality which is not planted nearly so often as it should be, valuable both for its comparatively late season and for its fragrant masses of yellow blossoms.

Going through the Pinetum to Howard's Field, we find the species of Rosa at their best, to be followed towards the end of the month or early in July by the older sorts of Cabbage, Moss, Gallica and other kinds, long known in gardens but only recently returning to favour. To both of these collections additions have been made during the past winter and those interested should certainly not omit to see them, despite the extra walk. Here also are to be seen many species and not a few hybrids of Cistus and the allied genus Halimium, which flourish on the sandy soil and have endured the past winter remarkably well.

On the way back visitors may like to walk along the herbaceous border and note the progress of the plants there, although not many come into flower before July.

Some plants worthy of notice in the Temperate house are the several species of Fuchsia, *Asystasia bella* with clusters of lilac trumpet-shaped flowers, the splendid Australian Bottle-Brush, Callistemon, and the curious *Strelitzia reginae* from the Cape having blue and orange blooms on stems about 3 feet high. In the Half-hardy house nearest to the Laboratory grow the green *Delphinium macrocentron* from Kenya, the handsome climbing *Mutisia decurrens* with large orange flowers, and the shrubby yellow-flowered *Pentstemon antirrhinoides* from California, an uncommon species which is unfortunately not hardy at Wisley.

BULB EXPERIMENTS.

By D. E. HORTON, Kirton Agricultural Institute.

THE technique used in experimental work has been considerably modified during the past eight to ten years, and it should be appreciated that the reliability of results is governed by the style of experimentation. It is no longer satisfactory to use, for example, two plots, one treated and the other left untreated. Data so obtained should immediately be considered unreliable and unsuitable for publication.

The statistical examination of experiments involves numerous replications of a treatment, and requires a system of randomization of the various plots.

I have introduced my lecture with these remarks on the method of experimenting because a bulb is quite different from many other types of plants, and, as I shall be able to show you, reacts to variations in treatment in an entirely different manner from many other subjects of horticulture. It is for this reason that great care is required in carrying out any experiment with bulbs, while reliable data can only be obtained through the application of this modified system, to which statistical examination is applied before any recommendation can be made.

Our experiments and investigations have continually indicated the importance of the relation between the previous treatment a bulb receives, both in the field and the warehouse, and its ultimate performance when forced or replanted in a garden or field. Time does not permit going into full details of all our experiments. These can be studied at leisure in the reports which are issued from time to time. I propose, therefore, to illustrate this question of the effect of treatments with a few of the outstanding experiments and observations made during recent years.

First of all it is necessary to understand that bulbous plants such as Narcissi, Tulips, Hyacinths, Gladioli, etc., have an entirely different life cycle from that of the Tomato plant for instance, and during part of that cycle are stored in a dry state in warehouses or sheds at particular temperatures. I would like to make it perfectly clear that a bulb is not dormant when it is out of the ground. As a matter of fact one can say that a bulb is as active when in the warehouse in the dry state as it is when growing outside and producing roots, leaves and flowers.

It is possible to influence future growth by treatment in the dry state more easily than by some treatments applied to the growing plant. A simple illustration of this point is shown in regard to the handling of bulbs before planting—a point that can usefully be borne in mind by everyone. Two lots of bulbs from the same stock and variety were the subject of experiment. One lot was stored correctly and every care was taken to avoid bruising, while the other was stored too thickly in trays, and roughly handled; a few of the bulbs were dropped on the floor, but in no instance was there visible sign of damage. The results were very definite; the bulbs which did not receive careful treatment produced irregular growth, while some of the plants failed to mature and others were diseased.

During storage, chemical changes are taking place inside the bulb and the new root system, the leaves and flowers are developing, and in the Tulip the new bulb is forming. All these processes are influenced by storage conditions.

The effect of heat or cool conditions during storage retards or advances the growth inside the bulb according to the stage at which these temperatures are applied. For example, heat applied to a Tulip or Hyacinth before the bud has developed will advance that growth, while heat applied after the bud is complete within the bulb will retard the growth and the effect will be shown during the following growing season by the later flowering of the bulbs so treated. In commercial flower production, growers often treat a part of their stocks by heat before planting, in order to prolong the flowering period of a stock. In effect ten weeks at 72° F. prior to planting will, under normal conditions, cause Tulips to flower about two weeks after their normal time.

It will sound rather contradictory when I now show you that heat applied to certain non-forcing varieties of Tulips will make them suitable for forcing in what we call third round. Last year some of these forced flowers were exhibited at the Spalding Show, where they created much interest, especially because the quality of the flower was equal to that of the variety grown outside in the normal way. Fig. 56 shows the special room which we use at Kirton for applying heat to bulbs. An even distribution of heat is ensured by the system of overhead and under-floor pipes, with efficient ventilation in all parts of the room.

So far I have not dealt with heat in relation to Narcissi. Under ordinary conditions a Narcissus requires cool and well-ventilated storage. Artificial heat is not applied, but, as many of you are aware, hot-water treatment (3 hours, 110°) is applied as a means of controlling one of the most serious pests a Daffodil grower has to deal with. This treatment is applied previous to planting, and unless the correct stage of development inside the bulb is carefully studied, damage to flowers, leaves and roots is the result. We find in Lincolnshire that, generally speaking, the first week in September is the best time to apply hot-water treatment. Bulbs treated too early produce damaged leaves and flowers, sometimes no flowers at all, and those treated too late become susceptible to root damage. You will appreciate that a grower with several hundred tons of Narcissi to deal with finds difficulty in treating all his bulbs at the correct time, and so begins his operations earlier. From a bulb-growing point of view, split or damaged flowers as a result of too early hot-water treatment are of little or no consequence, but the flower grower would naturally sustain serious losses. We have been investigating this problem at Kirton for several years,

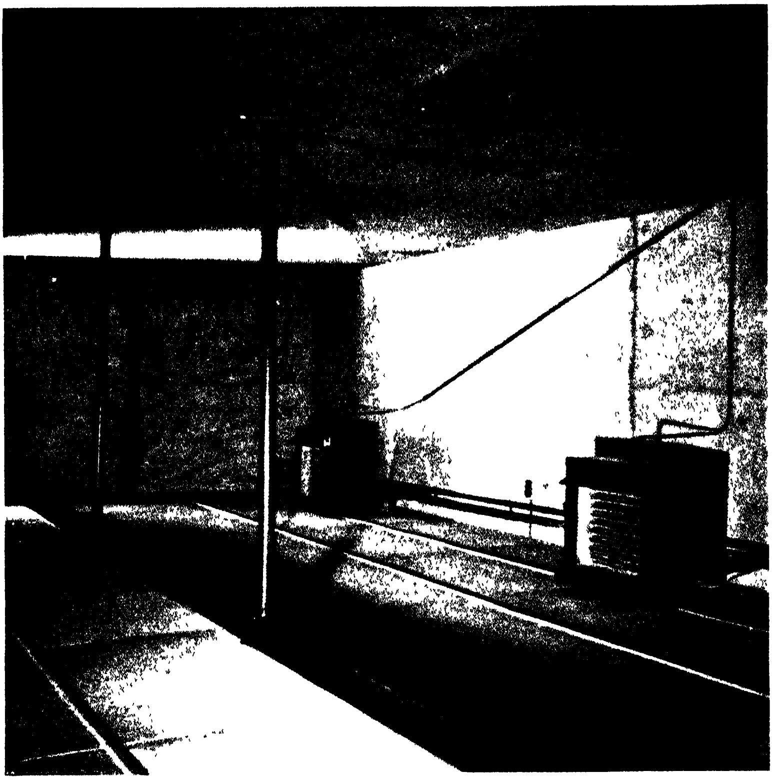

FIG. 56.—INTERIOR OF A COLD STORE SHOWING BLOWERS

To face p. 2[illegible]2

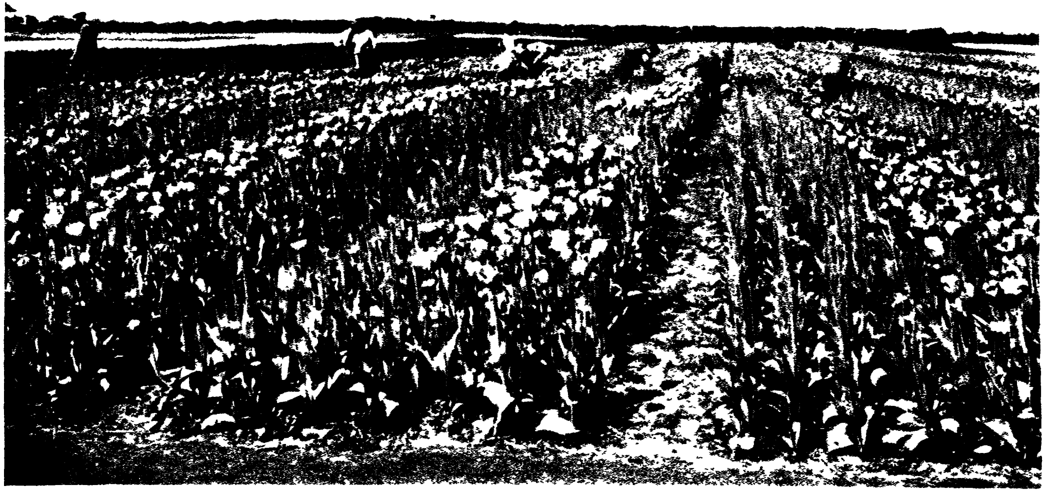

FIG. 57. HEADING [illegible]

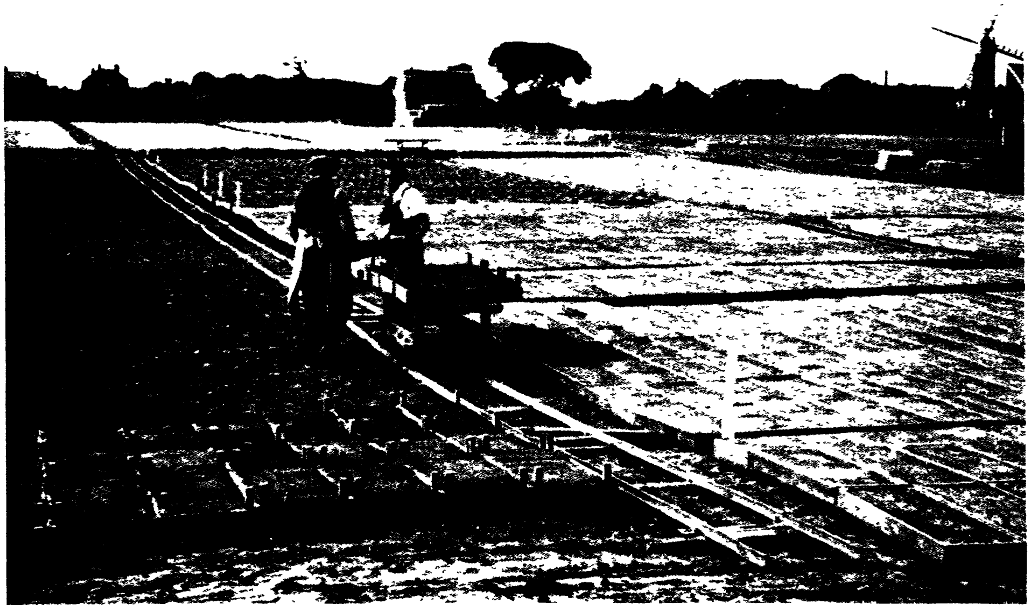

Fig. 58.—Laying out Boxes of Bulbs prior to Forcing

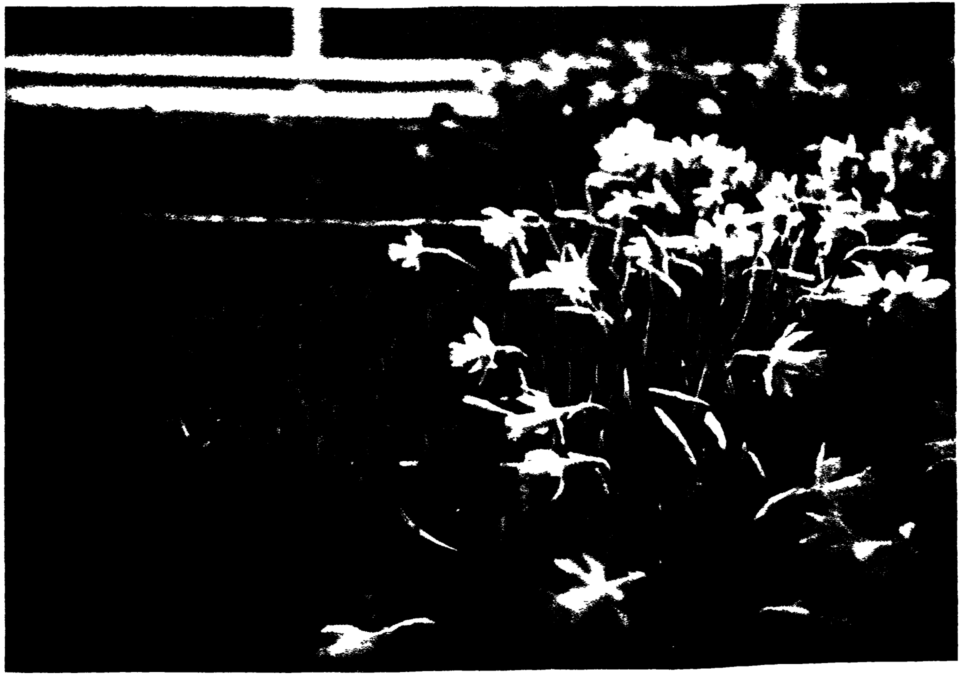

FIG. 50. NARCISSUS 'GOLDEN SPUR'

Growth of unprepared bulbs Growth of prepared bulbs

To face p. 253

and have found that the application of heat to the dry bulbs before hot-water treatment prevents flower-splitting and damage to the foliage. One experiment demonstrated the effect of one week at 75–80° and three weeks at the same temperature. The usual blotchy marks on the foliage are very evident in the control, while one week in heat precluded practically all damage and three weeks produced perfectly healthy leaves. It is interesting to notice the retarding effect of the heat treatment. There is, of course, much more work to be done in this direction, but I feel that we have found a treatment which will soon prove of great importance to the Narcissus grower.

I have now dealt with some of the effects produced by varied treatments applied to the bulb in its dry state. There are many factors which also affect subsequent growth as a result of outdoor conditions and cultivation. Such items as inefficient soil preparation, bad soil drainage, and so on, will adversely affect the bulb. The effect of acidity on Tulips is another interesting illustration, and shows that a Tulip does not do well in acid soil. We have found that a good lime content of the soil produces better growth and bulbs than a soil deficient in lime.

In the cultivation of Narcissi, one of the most important factors is the date of planting. This type of bulb reacts most favourably to early planting, both from the point of view of general growth as well as bulb increase. The experiments carried out at Kirton were designed to show the effect of planting in September, October and November, and the results certainly favoured the early planting. There were marked differences in the first season's growth. Those planted in September produced the strongest and most vigorous leaves and flowers, while the November planting showed the weakest growth. The differences in the weights of the bulbs lifted were considerable, the greatest increase being from the September planting. Circumstances did not permit an August planting. Had this been possible, an even better growth and increase in crop lifted would have been obtained.

The cropping of flowers from stocks growing outside is perhaps the most outstanding example of the cumulative effect both on the bulb as well as subsequent flowering quality. In the production of bulbs it is correct practice to remove the flower heads at full bloom (fig. 57). Those of you who have visited the Spalding district in tulip time will have noticed heaps of tulip heads at the edges of some of the fields. Incidentally, I would like to take this opportunity to answer a question which often arises regarding the use of these tulip heads for some other purpose. Attempts have often been made to produce dyes and scents from these flower heads, but so far no results have been obtained, except that during the war jam pulp was made from hyacinth flowers.

There are, of course, many growers who crop their flowers outdoors, and experiments show the adverse effect on the bulb crop. These experiments have been carried on over a period of three years, in order to find the cumulative effect, which is well illustrated by the weights of bulbs lifted each season. Originally, the bulbs planted in 1934 came from the same stock, and each year half of the plots were cropped as for market and the others were headed. Each year suitable bulbs were selected and forced, and again the effects were clearly shown. It should be understood that the bulbs selected were of equal size in both instances. The result not only showed a difference in the size of growth and flowers, but the colour and general quality were very inferior in those plots from which the flowers had been cropped. There was also marked effect on date of flowering and the weights of the bunched flowers, which also indicate the difference in the general quality of the forced flowers. The plots which had been headed during the previous seasons flowered earlier, and the average weight of a dozen flowers was 5 oz. greater than those from the cropped lots.

The effect of this treatment on Narcissi was rather different from that of the Tulips. In the second year of forcing this experiment, we found a difference in the quality and size of the flowers, but in the third year there was practically no difference in the size of the flowers. The outstanding point was the greater number of flowers from the headed lots. As in the case of the Tulip experiments, the Daffodil bulbs selected for forcing were of equal size and type.

I would like to bring to your notice an important factor which is of direct concern to those who purchase bulbs for the garden, greenhouse and general home decoration. I have already illustrated how a bulb reacts to various previous conditions and treatments, and shown that subsequent growth and flowering have a direct bearing on the conditions applied during storage or in general cultivation. It is very obvious that a bulb is self-contained. The flower, leaves and food supply are complete in the bulb at the time of planting, and the quality of the growth depends on the treatment which the bulb received during previous seasons. Tulips grown in sterilized sand, to which distilled water was applied as moisture for the roots, thus eliminating any supply of food other than that already contained in the bulb, show growth and flowers up to the standard of the variety. In previous seasons these bulbs had been carefully cultivated and every attention given to their requirements during storage. Your safeguard is therefore obvious. In order to obtain a good show of flowers the bulbs must be purchased from a reliable source.

Our work at Kirton, although mainly concerned with bulb production, involves investigations which are of importance to the flower grower, and some of our experiments deal with this aspect of bulb growing.

There is one particular experiment which should be of direct interest to those who grow bulbs in pots and bowls for indoor decoration. Bringing the bulbs into heat too early is a frequent cause of failure, irregularity of flowering, and in Hyacinths of stunted growth.

The experiment dealing with this problem was designed two or three years ago, when two varieties of Narcissi and one variety of Tulip were used. The boxes of bulbs were divided into three lots and placed in the greenhouse at varying dates. The idea that the early application of heat naturally results in earlier flowering is wrong. As the figures show, especially with Tulips, the later housing gave the best results. It is important to realize that in commercial forcing it is essential to flower and clear a crop in the minimum amount of time, in order to keep down expenses. The experiment showed that bulbs housed on November 26 did not complete their flowering any earlier than those housed on December 10. There was, therefore, a fortnight during which fuel and labour had been wasted.

It is, of course, unwise to apply dates to a stage of development in plant life, as these vary from year to year and according to season. The dates mentioned must only be regarded as an indication, and in some seasons variations can be made when it is possible to house bulbs at a slightly earlier or later date, but December 10 to 15 has been found to be the average time over a large number of years when Daffodil Golden Spur could be housed. These remarks apply, of course, to non-prepared bulbs. I will refer to the preparation of bulbs for early forcing later on.

Another treatment which shows how a bulb reacts to its environment, and affects subsequent growth, is illustrated in an experiment on the effects of covering and not covering bulbs before forcing. The practice of covering planted boxes with straw is very common in commercial forcing. In a few instances other materials have been used, but straw, provided it is clean and free from pests such as slugs, has been found the most satisfactory and convenient.

The idea of covering is twofold : first, to prevent the soil in which the bulbs are planted from becoming warm through atmospheric conditions, and, secondly to conserve the moisture. The first reason is perhaps the more important. You will remember that heat applied to Tulips after the bud is complete retarded the growth within the bulb : the same applies if the soil becomes warm. Observations have shown that the soil temperature is immediately affected by atmospheric conditions, and temperatures have been recorded as high as 74° F. Although retardation through soil in August and September would not be as extensive as heat applied in the warehouse, the effect is still noticeable, and in forcing of considerable importance, the main effect being to cause later flowering, and in large stocks irregular growth.

The term "blind Tulips" is applied in the trade to bulbs which produce flower-buds and which fail to develop. The causes are many and varied. This type of failure is mainly found in forced bulbs, although cases occur in the fields, one example being blind flowers in Narcissi due to hot-water treatment.

Blindness in Tulips is, however, a much more complicated trouble, and one reason, which is perhaps the most outstanding, is the use of bulbs of insufficient weight for forcing. The system of weight is applied to Tulips as a check on the substance of the bulb. It is, for instance, possible to have bulbs of 12 cm. weighing 45 lb. a thousand, while another lot of 12 cm. weigh 65–70 lb. a thousand. In appearance and size there may be no difference in the two samples, but the weights indicate the better quality bulbs. In the process of forcing, an unnatural strain is placed on the bulbs, and unless they are of sufficient quality, failures such as blindness result. Extreme dryness of the soil will also cause blindness, as well as the too early application of heat to the growing plant. The too early application of cold storage to the dry bulb is another cause of this type of failure, and it may be of interest to you at this point to give an insight into this method of the preparation of bulbs for early forcing.

I have already mentioned that after the bud is complete within the bulb, the application of cool conditions promotes the growth. This principle is applied in the preparation of bulbs for forcing. A cold store of the type illustrated is used. The walls of the store are specially insulated, and a system of coolers and blowers keeps the air at a temperature of 46–48° F. while it is circulated in the store. Bulbs are placed in trays in the room and kept at this temperature until in condition for planting. The application of wet storage is a continuation of the treatment, the planted bulbs being placed under the same conditions as before, but as yet investigations into this method of preparing are incomplete, and much work has to be done by experiment before it may be considered a complete success. The general operation consists of planting the prepared bulbs in boxes and placing these outside with a straw covering until ready for forcing (fig. 58).

The effect of cold storage is shown by the earlier flowering compared with non-treated bulbs (fig. 59), and by this method it is possible to produce flowers three weeks earlier—hence the reason for the flowering of Tulips and Narcissi before Christmas.

It is apparent that such a treatment as cold storage would present several problems, and I have already shown you one type of failure which can also be caused in this treatment. In an experiment carried out at Kirton this season, we placed bulbs from the same stock and of equal size in cold storage at various dates, the first lots being transferred on July 11, and each week thereafter another lot was cold stored, up to the end of September, when all the bulbs were planted in boxes; they were all placed in the greenhouse in December and forced. The results clearly indicated the date at which the bulbs were in condition to cool: that date was August 9. Bulbs placed in the cold store previous to August 9 (before the bud was complete) produced blind flowers, elongated leaves and stems, deformed flowers, and were a complete failure. Those stored on August 9 were perfect, while those cold-stored at later dates flowered later accordingly.

It is also essential that the bulbs should be perfectly dry before cold storing, in order to obviate premature rooting. Indications as to the time of planting are shown by the condition of the root ring or system—this swells, and planting should be done before actual roots become visible.

Hyacinth growing is also of importance in Lincolnshire, and I would like to deal with the main points of their propagation. Most bulbs reproduce sufficiently fast to meet the general demands of the trade. Hyacinths, however, are not so adaptable, and an artificial method of propagation has been in use in Holland for many years, but was quite new to the industry in Lincolnshire up to seven years ago, when Hyacinth cultivation was introduced. We have found it necessary to modify certain conditions when propagating Hyacinths grown in Lincolnshire, but the general principles are the same as those used in Holland. Several experiments are in progress which, if successful, will greatly improve the present methods. However, it is not for me to speak of such ideas until the investigations are complete and the experiments proved.

The knives used in Hyacinth propagation are of a special type. The propagation consists of two methods called cross-cutting and scooping. The bulbs are then placed in special rooms at varying temperatures until November, when the young bulbs have already developed (figs. 60, 61). These are planted in the ordinary way; each young bulb produces a growth of foliage. During the first season's growth the young bulbs absorb the food from the fleshy scales to which they are attached, and when lifted the following season the old bulb has disappeared and many independent young bulbs are produced. These are cleaned and dried and replanted separately, and so on until they reach a saleable size in two to four years' time.

The whole story of Hyacinth propagation is a long one and would form a separate subject. This also applies to the question of diseases and pests of bulbs, so I do not propose to go into details on this matter, except to refer to a few of the diseases and pests which we have to deal with at Kirton.

In Narcissi, eelworm may be considered one of the most important pests, and one always thinks of the work of the late Mr. RAMSBOTTOM in relation to the control of this pest. I have already referred to the method of control, and mentioned the investigations which we have carried out in this treatment. There is, however, one point which should be noted. In a bulb badly infested with eelworm, symptoms occur which have in the past misled growers into thinking that the trouble was caused by a fungus, a condition referred to as base rot. In 99 per cent. of the cases eelworm was the trouble, but owing to its intense activities it appeared as though a fungus was active, owing to the presence of a woolly substance in the base of the bulb. This substance was, in fact, eelworm in its cotton-wool state.

Bulb scale mite is another pest, perhaps not so well known, and it shows up mainly in forcing. Growers are becoming aware of this trouble, which if not controlled could prove as serious as eelworm. Hot-water treatment is a satisfactory means of control.

In Tulips, fungus diseases present the main problems. Tulip "fire" is one which, given suitable weather conditions, as in 1937, can cause serious damage to crops. Several sprays are now marketed and may be considered satisfactory under normal conditions.

The frequent use of the same soil in forcing Tulips results in attacks by a fungus, *Sclerotium tuliparum*, which as yet has no common name in English. Fortunately, sufficient land is available in Lincolnshire to permit a rotation of cropping, so that this disease is not prevalent. It does occur, however, in the greenhouses, where the same soil has been continually used in Tulip forcing, and in Holland, where change of land is limited.

I have referred to four of the many diseases and pests which attack bulbs. There are many more, but time does not permit of going further into these troubles. I would like, in conclusion, to mention another activity with which we at Kirton are concerned. The Royal Horticultural Society's variety trials, which have been carried out at Kirton for several years, have always created much interest among the growers. A system of tabulating details of the performances of these varieties was designed by the Society, and each variety is planted and left down for three years, during which time notes are taken in regard to all the characteristics, such as dates of flowering, size and quality of flowers, growth, etc. At the end of the three years these details are sent to the Royal Horticultural Society together with a photograph. We also have some 300 different varieties of Narcissus, which form a collection of newer sorts and these are compared with standard varieties as in the case of the Royal Horticultural Society's trials.

There is no doubt that bulbs present many complications, perhaps due to their being morphologically so different from other plants; but if variety is the spice of life, we certainly get that in our investigations. Each year something different turns up and offers more material for research. I think that, among all the members of plant life, bulbs present some of the most interesting problems that are encountered by those engaged in such work as mine.

MASTERS MEMORIAL LECTURES, 1939.

HOW PLANTS HAVE FOUND THEIR HOMES.—I.

By J. C. WILLIS, M.A., Sc.D., F.R.S.

[Read April 18, 1939; Sir DANIEL HALL, K.C B, LL.D., D Sc., F.R.S., V.M.H., in the Chair.]

OUR subject is usually called the geographical distribution of plants, and with it is bound up the way in which they came into being, formerly called their creation, now their evolution. Why do some grow only in one place or in one kind of place, some only in another? Why do the areas that they cover range from almost half the world down to a few square yards? Why does a fen contain one lot of plants, a moor, perhaps close by, a different lot?

We really know little or nothing on this subject, but I propose to bring forward the various explanations that have at different times been given of these facts, explanations which often amount really to nothing more than putting the facts in different language. But please do not imagine that I am expounding the standard gospel of distribution, for many of my opinions are regarded as very heterodox.

The difference between one kind of plant landscape and another, for instance between beechwoods and chalk pasture, so frequent in the south of England, was probably the first great botanical fact to force itself upon the attention of mankind, for it could not fail to be noticed. If anyone had the curiosity to try, he would find that often the plants of the one would not grow in the other. He would notice that the soil was different, and probably conclude that this had something to do with the fact that heather was common in one place, oak trees in another, and marram grass in a third. But where did they come from and why were they there?

The next stage in knowledge of distribution was perhaps the reports of travellers. One of the earliest and greatest of these was MARCO POLO, whose wonderfully accurate descriptions were not believed. It was perhaps for this reason that what we now call travellers' tales began with his successors; and certainly they appealed more to the public. Gradually they have become less astonishing than the tale, for example, of the barnacle geese that were hatched from a tree on the coast of Lancashire, or even than the tale of the famous dragon tree of Teneriffe, which I have lately found in a standard school geography book used by my ancestors in 1739, and published, it is interesting to notice, at the Sign of the Looking Glass upon London Bridge. "Upon this tree rests a cloud which drops daily for two hours the finest and sweetest water, of which the inhabitants may gather thirty barrels a day, and this is all the fresh water in the whole island." Even so lately as fifty years ago, a well-known Governor of Ceylon complained that while people in England would swallow all kinds of yarns about that island, they would never believe his true stories, that there were fish that could sing, fish that could climb trees, and spiders' webs so strong that one thread would pull off the hat if it were to catch it by the knob. Of all these I have myself had personal experience.

With increasing intercourse, people began to realize that in Italy, for example, there occurred individual plants like the olive, the stone-pine, and the cypress, unknown here except with some kind of protection. There were special botanical landscapes like the macchie. The most evident differences in conditions were the greater heat and greater dryness, and these were added to soil differences as probably having something to do with the distribution of plants. Going eastwards, one found the country gradually becoming drier and drier, till in Asia one found real deserts.

Further south, in the damp tropics, palms and bamboos began to be conspicuous parts of the vegetation, and other unfamiliar forms, like the banyan, appeared. Still later, when the tropics were passed, South Africa began to show arrangements of the plants that were not unlike those of Europe, though the actual plants were mostly different. Strange plants were also found in Australia.

In southern South America and in New Zealand travellers found yet further interesting phenomena that required explanations that the then state of science was ill fitted to supply. In New Zealand, for example, there were found many buttercups, obviously like those that grew in Europe, but of different species, also many willow-herbs and other common European types. Between these plants and their nearest relatives, there was a great space of sea.

Up to this time, plants and animals were supposed to be the result of special creation, each one being created in the form and more or less in the area in which it existed. In other words, the differences between one part of the world and another that we have just been dealing with, were more or less preordained, and though the New Zealand phenomena were very remarkable, there was nothing to be done about it.

These and other facts began to make people feel that the old theory of special creation might have to be replaced by something more suitable, especially when it was found that a number of New Zealand plants, like the common bulrush or the silverweed, were the same species as in Europe. If one bulrush or silverweed was good enough for two countries so far apart, why was it necessary to create so many buttercups and willow-herbs? New Zealand is not united to Europe by land; was the bulrush specially created for New Zealand to match the European one, or had there been a land connexion for it to come by? Reason refused to believe that all these remarkable facts must go without further explanation.

Other problems came up with the growing knowledge of the floras

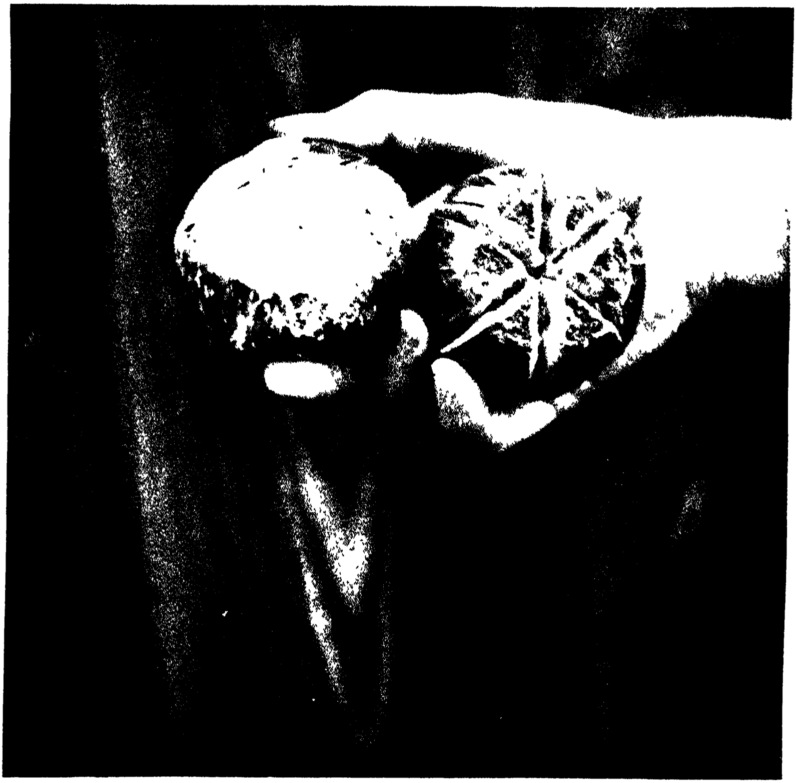

FIG. 60.—CROSS-CUT AND SCOOPED HYACINTH BULBS

[*To face p.* 260

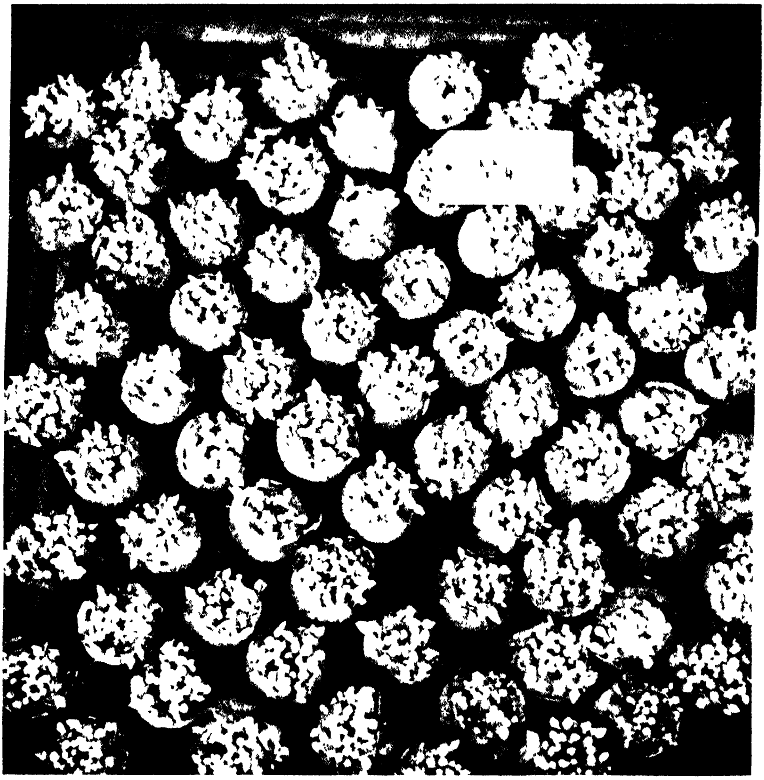

Fig. 61. Propagated Hyacinth bulbs ready to plant.

of other countries, and the resemblances and differences that were found required some better explanation than special creation.

Yet again, with increasing systematic knowledge, it was being found out that while sometimes a species might occupy an enormous area, like the bulrush just mentioned, more often its area was only of medium size, and still more often small, or very small. Many individual species were to be found, for example, each confined to a single mountain top or smaller area. This was yet another problem that required some more satisfactory explanation of how plants arose.

This period corresponded roughly with that of the publication in 1859 of CHARLES DARWIN'S famous book The Origin of Species by means of Natural Selection, or the Preservation of favoured Races in the Struggle for Life. For two thousand years there had been a vague floating idea that such things as the tiger, the leopard and the cat, or the ryegrass, the wheat and the barley, must owe their likeness to having descended in some way from a common ancestor, and having in the descent become modified in different directions, so that the final product was species that show the resemblances and differences of those now existing. This is what we mean when we say that evolution has gone on. One species may in time give rise to one or more different from itself.

Distribution was clearly not properly explicable upon the old theory of special creation, and if something of the kind just indicated could take the place of that, it was evident that results of interest and importance might be expected to emerge.

DARWIN'S great stroke of genius was to bring into service a factor which everyone could see at work in daily life, and which for a long time seemed fully capable of operating the mechanism of evolution. This principle he termed natural selection, now a household word, which he defined upon his title page as " the preservation of favoured races in the struggle for life." Everyone knows the struggle, and the catch-phrases associated with it, such as " everything seems overcrowded," " there are not enough jobs to go round," " why not emigrate ? " " the best man wins," and so on.

Natural selection was based upon adaptation, a subject which has perhaps been more discussed than any other in biology. If a plant can hold its own in a particular place, under the conditions of soil, light, temperature, rainfall, moisture of the air, and so on, and the surroundings of other living beings that there obtain, we are accustomed to speak of it as being adapted to those conditions. The word simply means suited, but with the implied meaning that it was suited by some agency or other. This is where natural selection comes in, as the agency ; for the competition upon which it is based, which we usually call the struggle for existence, and which is due to the fact that more individuals are usually born than can survive, will evidently kill out those plants that are in any way seriously unsuited to any of the conditions, and it may also kill out plants that may be quite well suited. And it must never be forgotten that mere chance has a very great deal to do with the result. If on a given spot A and B have to compete for survival, and A arrive and germinate a few days sooner, B will probably have no chance, though it be somewhat better suited to the place. On the whole, however, natural selection may be expected to kill out more of the less well suited than of the well suited. But in itself this would not produce any advance in complexity of structure or function, the things which we regard as marking the progress of evolution. Natural selection, working as we have described, would simply kill out all that did not come up to sample in each species. Certain assumptions were therefore required to make it work as an agent ensuring progress. Only a step which would convey some advantage could be picked out by natural selection. It was therefore supposed that when a gradual change of local conditions began, the offspring of any species might vary in such a way as to become more efficiently adapted to the newer conditions than was the parent. A second assumption, that the parent did not become adapted, was of course involved in this, and there is no evidence to back it. The parent must in any case have been suited to the older conditions, to have survived to reproduce, and we might expect it to make the slight functional change necessary. But evolution shows in *structural* change, and it was this that people were trying to explain. The superior adaptation of the new form was supposed to give it the victory, and the process being repeated in every generation, improvement being superposed upon improvement, the difference from the parent form would become at last so great that the new form might be regarded as a new species, which was superior in adaptation to the old. Evolution was thus to be regarded as a process which proceeded by continual improvement' in adaptation. The older and defeated species would tend gradually to shrink in numbers and be reduced to what were termed relics of previous vegetation. Increasing complexity of structure and function would be ensured by the continual adoption of the new and improved structures begun by the new variations.

Here was a mechanism of everyday life, pressed into the service of science, and in a few years so strong a current of opinion was created in its favour that all opposition was overwhelmed. As every man felt that he was one of those that had been picked out by it, he felt it his duty to support the theory to the best of his ability. Whilst DARWIN's immortal service to science was to establish the theory of evolution, the name " Darwinism " was given, not to evolution, but to the theory of natural selection, by use of which he had established it. Darwinism became a cult and has exercised great influence in many directions in science, in literature, in religion, and in politics, so that even national policies tend to be determined on the principle of " nature red in tooth and claw," a phrase based upon natural selection and at one time popular. This effect of the theory is another instance of the influence of the dead hand, which is so well brought out in WOOLF's After the Deluge.

Darwinism came in " like a flood," to quote HUXLEY, and the famous botanist, Sir JOSEPH HOOKER, the leader of the distributionists, became one of DARWIN'S lieutenants, for it seemed to him that Darwinism offered the best chance of progress for the time being ; but he also gave the sound advice " natural selection explains things better . . . it is to this latter that the naturalist should look . . . holding himself ready to lay it down when it shall prove as useless for the further advance of science, as the long serviceable theory of special creation . . . now appears to me to be."

Natural selection explained distribution also upon the basis of adaptation, the greater area being occupied by the better adapted species, and nothing new coming into being that was not an adaptational improvement upon what had gone before. For a long time this point of view seemed eminently satisfactory, and a great deal of work was done in trying to force distribution into an adaptational mould. And once it was fully realized that there was no immediate predestination in the differences of floras in different places, a great handicap to progress in distributional knowledge was removed. The new theory seemed, as does every new theory that makes a great change, to place the mysteries of geographical distribution well upon the way to solution, and was undoubtedly a great step in advance.

Once it was fully realized that Darwinism was based upon the idea that nothing could be evolved unless it were an adaptational improvement upon what went before, or were correlated with such, there was a great rush into the study of adaptation. But while it was clear that such parts of the plant as the root or the leaf were admirably adapted to their function, there was no necessary adaptational difference of importance to be found in any *differences* of form that showed in them. No one could, for example, show any difference in value between alternate and opposite leaves. Tremendous efforts which failed, were made to find an adaptational value in everything, and people went to great extremes, as may be seen in such a book as KERNER'S fascinating Flowers and their unbidden Guests. But no one could find any adaptational value in the vast mass of differences in form, structure and arrangement which distinguished one species from another.

Gradually it began to be realized that the study of adaptation was not leading anywhere, and that it had been pushed too far. The struggle for existence was mainly among seedlings, in which many important characters, like those of flower and fruit, had not even begun to show. The adaptation is there, for a plant not adapted to the local conditions will not be allowed by natural selection to survive, unless by chance. It is, however, mainly an internal affair. Most of the plants that range over enormous areas into different conditions show no external characters of serious difference ; they remain the same species throughout. The unsound assumption in the whole position is that the structural characters, or characters of form and position, by which we are able to distinguish one species from another, are necessarily also the marks of the functional changes that may have gone on in the plant to suit it to some other conditions. One is only too apt to make this assumption, for one is anxious to *see* something to which one can point as adapting a plant to something or another.

Here we come to the many special cases in which a plant shows something that one may probably regard as a definite adaptation. Climbing plants, for example, are often said to be adapted specially for climbing. True it is that they are well suited to doing so, but when one comes to try to think out how it could be done by the aid of natural selection, one is at once up against serious difficulties, and is almost forced to believe that the production of climbing habit could not have been effected in a gradual way. One constantly finds, in the same genus, one species that climbs, and another that stands erect, so that the habit was evidently easy to acquire. As the great bulk of the flowering plants do not climb, and a climber must have a support, one may probably assume that the erect habit was the earlier. But to climb, the stem must be weak and flexible, and one cannot imagine natural selection picking out the beginnings of weakness in erect stems. Once the stem has become weak and flexible, it cannot start to climb till it has acquired either the habit of nutation, *i.e.* waving movement of its outer end, or organs with which to climb. But it cannot acquire these till it is flexible, so another long period must be allowed for it to remain limp at the foot of its future supports and to learn to climb. It will have a poor chance of life in this state, but supposing that it survive, it will by this time have become so accustomed to living in comparative darkness, by the internal and physiological adaptation that must go on if it is to survive, that one does not see why it should still want to climb up into the light. And finally, when it does at last climb up into the light, it will have to reverse all the adaptation that went on in it to fit it for the darkness. There is a tremendous amount of internal and physiological adaptation to be done in the course of this history. One cannot but look with some suspicion upon such an easy interpretation of such structural features as, for example, twining stems as being adaptations. If they were gradually formed, the work was too complex for natural selection.

Thus, though a climbing plant is undoubtedly suited to climbing, it will not do to take for granted that it is an adaptation for that purpose. What is often regarded as adaptation pure and simple is more complex than it appears, and cannot be so simply explained.

Cases in which it is easier to suppose a gradual acquisition of an adaptation are the plants of dry climates such as Arizona or South Africa. Geological evidence seems to show that the world is gradually becoming drier, so that we may probably regard these plants—xerophytes, as they are often called—as being a later development than the plants of average moist climates, or mesophytes, which make up the larger part of the flora of the world. Climates would be unlikely to become suddenly dry, so that one can easily imagine the plants becoming slowly suited to a climate that was becoming slowly drier. Some plants have become suited enough to dryness by thickening their cuticle or by covering it with resin or wax, by rolling up the leaves, as in marram grass, by a surface covering of hairs, by the overlapping of leaves, by tufted growth, as in so many mountain plants, and so on. But all these are conceivable as gradually acquired under the influence of natural selection, as is also the extreme adaptation to drought—the storage of water in the tissues that one sees, for example, in cacti, which one can imagine going on to a greater and greater degree as the climate became steadily drier. It is hard to accept climbing habit, or several other things, as being definite adaptations for the purpose of climbing, or as being gradually acquired, but one might accept most of the adaptations of the xerophytes as having arisen in this way. But they do not often make great morphological differences.

The only adaptation that we can definitely call such, feeling that we are probably not far from the truth, is the internal adaptation that goes on in a plant to suit it to slowly changing conditions, an adaptation that is physiological, and which does not necessarily show to the outside any change in the structural characters whatever. Animals, for instance, and especially insects, can be gradually accustomed to living upon new kinds of food until they dislike the old ones. When I went to Ceylon many years ago, I adopted a small dog that had belonged to my predecessor, and which by slow and gradual degrees he had taught to like mangoes and strawberries, and to drink tea without milk. It was unhappy without such food at times, and I could give other instances of the same kind. Similar cases could be quoted for plants, like those that grow on the selenium-containing ground in the United States, are poisonous to stock, and will not readily live without their selenium ; and so on.

The important feature about this functional adaptation, which goes on gradually is that there is no necessary structural change, at any rate such as is visible in external features, accompanying it. *Hydrocotyle asiatica*, for example, is essentially the same plant, judged by structural characters, whether it be growing in the hot and damp plains of Ceylon, with a temperature varying between 70° and 90°, on the high mountains of Ceylon, with a temperature between 40° and 70°, or in Stewart Island, New Zealand, with winter snow and frost, and a far weaker sun. The Ceylon plants are adapted to the Ceylon conditions, and the New Zealand ones to the New Zealand. But people are apt to forget the differences when a plant ranges so widely as does this, and to say that the Hydrocotyle is adapted to the whole range of conditions in which it lives. The experiment has not been, but ought to be tried. But experience with acclimatization of exotic plants, which made part of my work for many years, makes me doubtful if seed from Stewart Island would at once succeed in the lowlands of Ceylon, though it might perhaps succeed in the higher mountains there, where also *Hydrocotyle asiatica* is found. I also doubt whether seed from the plains of Ceylon would at once succeed in New Zealand.

Liberian coffee, when first introduced into Asia, was a strictly tropical species, which would only grow in the low-lying and warmer plains to succeed as a crop. But when I was in Java in 1904 people were trying to make it succeed at higher levels, for most of Java consists of high mountains, and the area of the plains is limited. Each time the plant fruited, seed was taken to a slightly higher level, and they were thus gradually suiting it to living and to producing fruit at higher levels than that to which it was normally accustomed. In Ceylon, when we tried to introduce the beautiful *Cyperus Papyrus*, and obtained seed from Europe, where the plant had presumably become used to little sun, we failed, but when we got seed from Saharanpur in India we succeeded. The common Lantana, here a plant carefully cherished in a pot, was introduced into Ceylon about 1825, and after some time spread all over the island upon waste ground. When I went out to Ceylon, the Mexican *Tithonia diversifolia*, a sunflower-like plant, had been in the botanic gardens for forty years without giving any trouble. During that time it had evidently become fully acclimatized to the local conditions, and all of a sudden, as it seemed, it began in its turn to spread upon the waste ground which up to that time had been occupied by Lantana, causing a mixture of the two in nearly every place. In this connexion it is of special interest to note that Lantana produced a fleshy fruit which was carried by birds, and people used to remark upon the value of this " adaptation." Then came Tithonia, which though a member of the Compositae had no pappus to carry its heavy fruit, and spread largely by means of vegetative reproduction, yet spread just about as rapidly as did the Lantana.

Analysing the question like this, one realizes that adaptation is a more complicated phenomenon than can be readily explained by the use of natural selection as an agent of progress. There were also other awkward snags against which natural selection came up from time to time. The simple variation which goes on in every part of the plant was shown to be simply a quantitative variation. A leaf might vary in length or in thickness, but not (unless in definite steps) from simple to pinnate or palmate, or from one of these to the other. It did not vary from alternate to opposite, or vice versa, from a dorsiventral structure like that shown by an ordinary leaf which faces upwards to an isobilateral structure like that shown by a Gladiolus leaf, which faces horizontally, nor did it vary in the direction of parallel-veining to net-veining or vice versa (one of the great general distinctions between Dicotyledons and Monocotyledons).

In other words, the regular variation very rarely, if at all, initiated anything that would result in what we call a morphological change of any importance, such a change as shows even between one species and the next, and much more between one genus or family and the next. Further, the changes that it might bring about were not fully hereditary, and could not therefore be passed on to the offspring unaltered—a necessary thing if natural selection was to bring about specific change by their means. The variation was not irreversible. And there was also no reason why the needed variation should appear at all, and if it did not appear, natural selection was helpless. Or again, to put the matter in a kind of personal way, if A got the offer from Nature of a variation in the direction of Y, which was quite worth going on with, and had started in that direction, and then Nature suddenly came along with an offer of a variation in the direction of Z, much better, but quite contrary, what was to happen then ?

The case against natural selection as the agent directly responsible for progress in evolution was very strong, and gradually it ceased to be invoked with the former full belief in its efficacy. Its effects must be looked for as exercised in some indirect way. Chance has too large a share in the struggle for existence. This may be seen in modern social legislation, which does all that is possible to eliminate the effects that are due to chance.

We have been accustomed to assume (there is no proof) that the structural characters of the plant must necessarily be the indications of the functional changes that must have gone on in it to fit it to occupy new places in which the conditions differ. No plant with any serious maladjustment is likely to survive at all. A plant is probably born with more or less likeness to its parents in suitability to conditions. If the climate or soil, or other things, be changing very slowly, the plant will probably change, functionally, to match ; if too quickly, a barrier will be formed against its further spread. This question of barriers is of great importance in the distribution of plants. We have seen how a climatic barrier may be gradually formed, and there are the more definite barriers of seas, of high mountain chains, of sudden climatic changes, and so on, so that a new species may easily find itself with a very limited area in which to expand its distribution.

There seems no reason why this change in conditions should be accompanied by structural change, as indeed may be seen in the wide-ranging species that often cover such great areas, and must be subject to such great variety of conditions. We had an instance above in the distribution of *Hydrocotyle asiatica*, which nevertheless showed no serious structural differences, and was the same species throughout.

If we deal with average plants of average climates, technically called mesophytes as living in the middle, we soon find that there is nothing in the make-up of the plant to show from what kind of conditions it came. This is a very strong argument against the supposition that the structural differences are the expression of the functional differences. Take one of the first genera in the British flora, Thalictrum. the meadow-rue. We have three species in this country, *Thalictrum alpinum* with a bi-ternate leaf, in alpine bogs, *T minus*, with a tri-pinnate leaf, in chalky pastures, and *T. flavum*, with a bi-pinnate leaf, on river-banks. In the next genus, Anemone, we find *Anemone Pulsatilla*, the pasque- flower, growing in chalky places with bi-pinnate leaves, and *A. nemorosa* the wood anemone with ternate leaves, growing in woods, as also does the blue mountain anemone, *A. apennina*, with tri-ternate leaves. Thus in these two closely allied genera, and in similar conditions, we have ternate and tri-ternate leaves in woods, bi-pinnate on chalky places and on river-banks, whilst the bi-ternate leaf in Thalictrum occurs in alpine bogs, and the tri-pinnate on chalky pastures. And these are the most important characters of difference between the species. As a general rule there is nothing in the structural characters of the plant to give the least indication of its proper habitat, and no one could say, from dry or even from living specimens, from what kind of conditions it came, so long, at any rate, as it belongs to the vast group of the mesophytes.

In TANSLEY's Types of British Vegetation, lists are given of the inhabitants of such uniform kinds of conditions as occur on a heather moor, a sand dune, and so on. The first half-dozen names of dune plants will serve to illustrate what I am describing: *Ammophila arenaria*, the marram or meol grass, *Eryngium maritimum*, the sea holly, *Galium verum*, the yellow bedstraw, *Senecio vulgaris*, the groundsel, *S. Jacobaea*, the ragwort, and *Carlina vulgaris*, the carline thistle. None but the first two, which show slight xerophytic characters, give any indication that they would be likely to inhabit sand dunes. Yet the plants must be suited to life there, and have some adaptation to the drought which they are liable to encounter. Sandhills are not their normal mode of life (except the first two), so if they did not become physiologically adapted to living upon sandhills, they must have come there only with the adaptation already present. But natural selection could not, in other places with different conditions, *adapt* them to life upon a dune; it must be just a case of luck.

It is important fully to grasp the fact that the structural or morphological construction of a plant has all but nothing to do with its physiological nature and capacities, which are the things that suit it to its surroundings. On one side an evolution has gone on and has produced the structural differences that now exist; and on the other side an evolution has gone on, which has produced the physiological or functional differences that exist. What correlation and what connexion there may be between the two remains to be found out. It is highly probable that there is some connexion, but at present we have no guide to an explanation. The ordinary mesophytic plant shows nothing that we can regard as special adaptation, except such universal features as root, stem, and leaf, or flower, fruit, and seed, and only comparatively rarely can we regard *differences* in any one of these as being certainly adaptive.

To return to the more strictly distributional matters, if one takes a small family, other than an ordinary family of water plants, which, as they are very old, and can find almost the same conditions everywhere are very widely distributed, one finds its members usually growing in fairly similar conditions. But the larger the family and the area occupied, speaking generally, the greater is the variety of conditions in which its members grow. But even if the family becomes very large, and covers every possible variety of conditions, there is still, among its members, much greater uniformity in structural character than among the half-dozen plants of a sand dune quoted above. A grass is much the same whether it grows in arctic or in tropical regions, in the plains or on the mountain tops, by a river bank or in a desert. The same may be said of almost any large family.

When I went to Ceylon in 1896, after having been personal assistant for some years to that best and kindest of men, Sir FRANCIS DARWIN, the son and helper of CHARLES DARWIN, I had been brought up in the inner circle of the selectionists, and was an ardent disciple of that theory. At that time anything that looked a little unusual in morphological characters was at once regarded as probably showing some special kind of adaptation. One must not forget that the theory of natural selection is based upon adaptation, so that everything had to show adaptation, or be correlated with something that did.

Soon after arrival I began to study that very remarkable family the Podostemaceae. They occur everywhere in rapids throughout the Tropics, and are so strange in appearance, that I took for granted at first sight that there was a case of extreme adaptation. They look like mosses, liverworts, or bladderwrack seaweed, often having even the brown colour. They have the rocks all to themselves, and live in a current of from one to eight miles an hour. During the wet season they remain vegetative, forming the flowers towards the end of it, and at the beginning of the dry season the flowers open as soon as the air catches them. The fruit is quickly ripe and the plant dies, leaving an immense number of seeds, which have not even such a simple adaptation as that required for sticking to the rock, so that the enormous majority are simply blown or washed away.

If one only found them in their dead and dry condition upon the rocks, I am not sure that one would recognize them as being water plants. Their flowers are highly dorsiventral, *i.e.* the back and the front sides of the flower are very different—as one may see in a Salvia, an orchid, or a snapdragon. Such flowers usually stand more or less horizontally, and are looked upon as an adaptation to the visits of insects. But here the highly dorsiventral flowers stand stiffly erect, and have no insect visitors. Clearly the idea of adaptation requires some revision.

But there is no need to go into detail. In water plants of quiet water, there is little variety of morphological form, and the species range over enormous areas, finding similar conditions wherever they may go. There are very few species in a family. *Hippuris vulgaris*, the mare's tail, the only member of its family, is found almost all over the world. In the Podostemaceae, with which we are at present concerned, there are over 160 species, the largest number in any family of water plants, and they show such a variety in morphological form as cannot be matched in any other family of flowering plants.

But when one comes to inquire into the conditions under which they live—and I spent the spare time of six years in their study all over India and Ceylon—one finds that it would be almost impossible to conceive of more uniform conditions. They all live in warm climates, and under water. They live on waterworn rock only, and can never send their roots down into the rock ; they are all annuals. They flower only in the dry season, and ripen the fruit very quickly. Only if a seed catch in a bit of old dead plant, or in a crack in the rock, has it any chance of germination, so that few young plants are to be found, and nothing else grows upon the rocks with them. Their food comes from the water that flows so rapidly over them. Why then this very great morphological variety among them? There is even a marked difference in morphology between one continent and another.

At first one thinks that there must be little niches in which conditions are so different that one will suit one place, another another. But I soon found, both in Ceylon and in India, that one could get all kinds of combinations of species growing in one place, presumably on account of the uniformity of conditions. People looked at the Asiatic Hydrobryums, and said " obvious adaptations to fast water, which cannot tear them away." But then I spent some years in the mountainous country of southern Brazil, where there are very large forms, up to a yard or more in length, attached to the rock only at one end, growing in the most rapid water of all, twice as fast as anything in India, and with them were forms like the eastern Hydrobryums, attached to the rock almost all over.

My final conclusion was that the morphological structure had little or nothing to do with any functional adaptation. It was largely the result of the action of a force which acted upon all Podostemaceae alike, and with the maximum intensity possible throughout their whole lifetime. Their roots cannot grow except at right angles to the normal growth of roots, on account of the impenetrable rock. This means that the normal polarity of the plant, which makes its roots grow down and its stems grow up, is completely interfered with. This seems to me to be the explanation of their very dorsiventral structure. The great morphological evolution that has gone on has had no adaptational reason behind it, and might be called an evolution *de luxe*, were it not that one suspects that this is true of all morphological evolution to a great extent. Ordinary water plants do not show this variety, being in very uniform conditions without any overhead force; the Podostemaceae have such a force, and show great morphological variety.

We have given a good deal of consideration to this question of adaptation, for it is so universal in the vegetable kingdom, and there is no doubt that if a plant is not suited to the place and the conditions in which it is trying to grow, it will not for very long be able to survive there, or to reproduce its kind. The question of adaptation is very complicated, and someone once said in my hearing that it is a truism until one tries to explain it. But it seems to me that the question will be much simplified if we can get properly rid of the idea that the structural characters, which are the only things that show that evolution has gone on, have *necessarily* some significance in connexion with the adaptation which has accompanied that evolution. The Podostemaceae go to show that the structurally different forms may be more numerous than any adaptations for which there is any need, to say nothing of the fact that one cannot point out any adaptational characters in these forms. We need not, in other words, assume adaptational reasons for the existence of everything. Given time enough, almost any plant can probably acclimatize itself to conditions that differ but little from those to which it has been accustomed, and given a great expanse of time, even to conditions so different as we see in the case of *Hydrocotyle asiatica.*

But if we are not to look upon adaptation as having been all-important in determining the distribution of plants that exists, a considerable change will have to come over our present views upon this subject. At present people regard plants that have a wide distribution as having been so well adapted to conditions that they have spread widely, though they do not attempt to explain how a plant living, let us say in Europe, became adapted there to conditions in New Zealand. Most supporters of this view adopt the further one that the local plants are the last survivors of the species that were defeated in the struggle for existence. But many people hold on to special creation upon the other side, and look upon these very local things as having been specially adapted for just those small areas which they actually fill. If, as I have indicated in this lecture, we take a somewhat different view of the question of adaptation, we may come to some different views about distribution.

(*To be continued.*)

OBSERVATIONS ON ONION MILDEW CAUSED BY THE FUNGUS *PERONOSPORA SCHLEIDENIANA* W. G. SM.

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ONION mildew appears more or less every year, often doing considerable damage to the onion crop by killing the foliage prematurely and preventing the normal development of the bulbs. The bulbs are frequently invaded by the parasite, and in certain varieties the keeping qualities are impaired, the infected bulbs becoming soft and sprouting early. In the growing plant the fungus may exist for weeks, or even months, without any external indications of its presence. In infected plants sooner or later a downy growth or delicate bloom appears on the green leaves and flowering shoots; this is generally violet in the mass, and it consists of conidiophores and conidia, the latter being the summer spores by which the disease is spread and propagated. The mildew may appear at any time during the growing season from March onwards. Under certain conditions no external symptoms of the fungus may be visible, but when it reveals itself by the production of conidia the host cells rapidly die over the area where fructification has occurred, owing to the extra demands placed upon them by the parasite in the formation of its fruiting bodies. In addition to the summer spores, sexual organs are also produced which form oospores (or resting spores) within the host tissues.

The part played by these oospores in perpetuating the disease has in the past been imperfectly understood, and this paper presents some new facts which go considerably towards filling up this gap in our knowledge concerning this common disease of onions.

The Disease on the " Tree " or Egyptian Onion.—This onion provides a supply of young foliage for the kitchen during March and April, at a time when other onion supplies are low. As has already been pointed out (6)*, onion mildew is systemic in this host, invading both the root-stock in the soil and the aerial bulbils. The extent of damage to the foliage and stems is, however, not nearly so severe as with ordinary onions attacked by the fungus. The form of the disease attacking the Egyptian onion has been repeatedly transferred to the cultivated onion, *Allium Cepa* L., and it goes over from one to the other naturally, but in the Egyptian onion the disease presents some features not hitherto described.

In the section of the Botanic Gardens, Glasnevin, given over to medicinal plants and culinary vegetables, several Allium species are cultivated, amongst them being the "Tree" or Egyptian onion, and the following observations were made on these plots during the period 1931–1938 inclusive. The record in Table 1, except where otherwise indicated, is of fructifications either on a single leaf or on a single plant.

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* Figures in brackets refer to the list of references at the end

TABLE 1.—*First Fructifications of Peronospora Schleideniana in Botanic Gardens, Glasnevin, Dublin, 1931–38.*

Year.	Egyptian Onions.	Autumn-sown Onions.	Spring-sown Onions.	Onions raised under Glass and transplanted out.
1931	10 May	None	22 July	None
1932	22 May	None	11 August	None
1933	9 April	9 April	8 July	None
1934	25 March	28 June	21 July	28 July
1935	4 May	12 May	None	None
1936	30 April	None	1 August *	Second week in August
1937	28 April	None	None	None
1938	2 April	16 May	19 July	30 July †

* Several plants found with mildew on this date, though no fructifications were present on 28 July.

† Two plants found with mildew.

In 1933 the fungus fructified on Egyptian onions and on autumn-sown onions on the same date, but in the other seven years mildew was fructifying on the former host before it occurred on any other cultivated Allium.

In 1931 shoots of Egyptian onions containing the mycelium of the fungus were detected on April 12 by their yellow glazed appearance, but weather conditions were not suitable for sporulation and conidia were not produced until four weeks later. Similarly, in 1934, diseased shoots were recognized as early as February 11, and an examination of some of these shoots in March showed an abundant development of mycelium in the palisade tissues. It was obvious from its appearance that given favourable weather conditions it would fructify. The night of March 24 was mild and humid, and an inspection of the plants the following morning divulged a sparse formation of conidiophores and conidia. The weather suddenly changed again and remained cold for some time and fructifications were not again found on these plants until April 22.

Usually on infected Egyptian onions the fungus fructified freely during May and it was again prevalent on the top shoots and new growths during September and October. In the interval between these two periods of what might be termed maximum sporulation, viable conidia could, however, be found at almost any time, being scanty during continuously wet weather. On the other hand, during warm, dry weather in June and July, provided dew occurred at night, the mildew fructified just below the heads of bulbils, on the top ½–2½ inches of the fertile stems. This feature of sporulation was first noticed in 1932, and was confirmed during the seasons of 1934, 1935 and 1938. In 1934 and 1935 conidia could be found just below the heads of bulbils when none were present on any other part of the host in dry weather. Stalks were seen on which fructifications appeared simultaneously over a length of 1½–2 inches at their tops, but others were observed on which conidia were produced close up against the head of bulbils in a small band ½ of an inch in breadth. This band spready gradually downwards, producing at intervals of a day or two fresh crops of conidia at its advancing margin. The layer of fructifications formed on this region was distinctly pale green, not purple as is usual. The change in colour of the host stems in some of these instances was also most noticeable, the colour of the affected area corresponding to the "cress green" of RIDGWAY (9). This contrast in colour of the stems has been observed on several occasions before conidia were present (fig. 62).

In another part of the Gardens a single isolated clump of Egyptian onions was growing in which onion mildew was also systemic. In this clump in 1934 and again in 1935 the fungus likewise fructified below the fertile heads during dry, warm weather. In the month of June of 1934, 53 leaves and shoots were present on this clump, the majority of which were permeated with mycelium. Three of the fertile shoots were showing sporulation close up to the bulbils, but not a single conidium could be found on any other part of the entire clump. This was on June 6 after a period of dry weather. Rain fell on June 14 and during the following week conidia were produced freely on the lower portions of the fertile stems as well as on the leaves.

The conidiophores produced below the fertile heads during dry weather were much shorter and with fewer branches than those formed on the same plants under conditions more favourable for sporulation, their length being only from one-third to one-half the normal size. The conidia appeared to be of the usual dimensions. HIURA (3) has already drawn attention to the extreme variability in size of conidiophores and conidia of several members of the downy mildew group, including onion mildew, when the fructifications are produced under different environmental conditions.

In the wet season of 1936 sporulation contiguous to the heads of bulbils was absent, and it was not observed in 1937, but in 1938 it again occurred for a very short time during the very dry weather towards the end of April.

The last date in any year on which viable conidia were produced on Egyptian onions was November 6.

From the foregoing account it is seen that where these plants are systemically diseased with onion mildew, they act as a serious source of infection from March until the end of October or later. NEWHALL (7) records this host as an important source of infection to commercial plantations in America. In spite of the fact that the disease goes over readily from Egyptian onions to ordinary onions and frequently produces oospores in the latter crop, I have never found the sexual organs in the Egyptian onion though a careful search was made for them every season.

WEATHER CONDITIONS, SPREAD AND DEVELOPMENT OF THE DISEASE IN SUCCESSIVE YEARS.

TABLE 2.—*Number of days on which precipitation occurred in the Botanic Gardens, Glasnevin, and the rainfall in inches for each month from April to August, inclusive, for the years* 1931–38.

Year	April		May		June		July		August.	
	No of days	Rainfall inches	No of days	Rainfall inches.	No. of days	Rainfall inches.	No of days.	Rainfall inches.	No. of days.	Rainfall inches.
1931	19	2·94	22	3·58	19	4·24	24	3·70	13	3·40
1932	21	2·39	25	3·52	6	0·43	26	4·68	12	1·59
1933	11	0·87	17	2·30	12	1·56	16	1·89	13	0·72
1934	19	2·33	15	1·62	14	1·53	14	1·81	19	3·17
1935	19	1·95	8	1·76	23	2·88	11	0·82	11	2·30
1936	17	1·91	12	1·33	17	3·08	27	5·24	13	1·14
1937	16	1·80	14	1·34	14	1·24	17	1·96	11	2·69
1938	4	0·09	22	2·75	21	2·91	19	4·49	16	2·66

In 1931 the spring-sown crop was growing alongside a row of two dozen Egyptian onions (most of which were systemically diseased) and was exposed to continual infection from May 10; nevertheless, the disease did not appear on these spring-sown plants until July 22, and it only reached a severe stage on their foliage during the second week in September.

In 1932 the mildew did not appear in the spring-sown crop until the second week in August and very few plants showed fructifications of the fungus up till the time the crop was harvested.

The year 1933 was a dry year with a very low rainfall throughout; notwithstanding this the mildew spread continuously during the whole summer, and it was one of the worst years for the disease ever experienced in the Botanic Gardens. The disease appeared on autumn-sown onions early in April, spread and developed so rapidly in this crop that early in July from three to four leaves of every plant were killed by the fungus. The earliest fructifications on the spring-sown onions occurred at the beginning of the second week in July, but these were so quickly followed by numerous other diseased plants that it was evident mass infection had been taking place throughout June. Six varieties were growing in the plot, and by the end of July 75 per cent. of the leaves of some varieties were dead, and the least susceptible had 25 per cent. of their foliage killed.

It will be seen from a glance at Table 2 that the rainfall for the entire season was very low. During 1933 two factors operated not only in the spread of the disease but also in the rapidity with which infected plants succumbed. The first of these was the very early appearance of mildew in the autumn-sown crop; the second was dew. Though the weather was dry and warm for the greater part of the time, heavy dew occurred almost every night during May and June, with the result that viable conidia were in abundance practically every morning. Even under the weather conditions existing in July, infection of fresh leaves was soon followed by sporulation.* Dew is a much more potent factor in the production of conidia than rain. As long ago as 1887 **SHIPLEY** (10) observed the influence of heavy dew as favourable for this fungus, and **HIURA** (2) states that "conidial production is favoured by humid but not very wet weather."

Onion mildew appeared on autumn-sown plants in 1934 towards the end of June and the disease was present on a number of these plants by the third week in July, but little harm was done, the bulbs being then almost mature. The spread of the disease in the spring-sown crop was, however, similar to that of 1933, the first diseased plants being rapidly followed by others. During the last ten days of July, from 25 to 50 per cent. of the foliage was killed, depending on the variety, and this spring-sown crop suffered severely. It is occasionally stated that onion mildew is severe only in wet seasons, but 1933 was a very dry year, and the rainfall in 1934 for each of the months May, June, and July was slightly less than that for the same month in 1933.

With regard to the development of the disease in 1934, the fact of adjacent Egyptian onions producing conidia freely from April 22 onwards throughout May must be taken into account. At the same time the spread of the disease and the harm done to the spring-sown crop in 1934 should be compared with that in 1931. In both years diseased neighbouring Egyptian onions provided a continual source of infection, and the mildew appeared at the same time in the spring-sown onions, but its subsequent development was entirely different.

In 1935 there was no spread of onion mildew in the Botanic Gardens. The Egyptian onions, in which mildew was systemic and which were a constant source of infection, were removed and destroyed in the winter of 1934-35, the only specimens retained being transferred to an isolated spot. The fungus fructified on one plant of the autumn-sown onions on May 12, but the prompt removal of this plant prevented any spread of the disease, and no other mildewed plant occurred either in the autumn-sown onions or in those sown in spring.

In 1936 the mildew was present on the isolated Egyptian onions by the end of April, but though June and July were wet the autumn-sown plants escaped infection. On the spring-sown crop the disease made its appearance on August 1, when it was observed on several plants. The rainfall for August was low, but the mildew ran a rapid course, and by the third week of the month the varieties 'James Keeping' and 'Golden Ball' had 75 per cent. of their foliage killed, and all others suffered badly, every single plant being attacked early in September.

No spread of the disease occurred in 1937, the only plants showing

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* Onion mildew was not the only member of the Downy Mildews which the climatic conditions of 1933 favoured. Others which were virulent the same season were:

Peronospora parasitica on seedling Brassicas during April,
Peronospora Viciae on culinary peas in May, and
Peronospora Trifoliorum on red clover during May and June.

Fig. 62. Fertile shoot of Egyptian Onion showing discoloration before the fungus Peronospora Schleideniana fruits

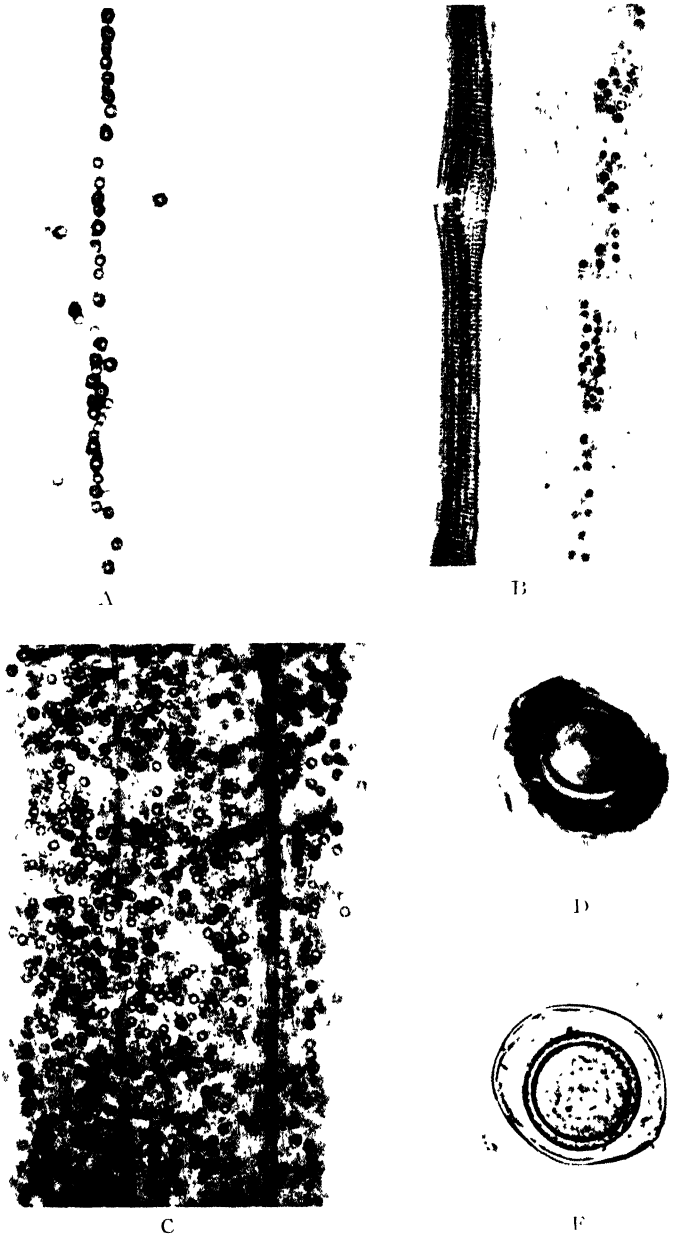

FIG. 63 PERONOSPORA SCHLEIDENIANA

A, Row of oospores on hyphal strands B, Formation of oospores parallel to vascular bundle in onion leaf C, Mass production of oospores in leaf tissue D, An oogonium with ripe oospore E, the same cleared with dilute caustic potash A, B, C, D × 45 E × 450 mildew being two widely separated clumps of Egyptian onions, and both the autumn- and spring-sown onions escaped infection.

In 1938 mildew was found on one plant of autumn-sown onions on May 16 and several diseased plants occurred one week later in the same plot. The latter end of May was showery and the months of June and July were very wet with scarcely any sunshine until near the end of July. From May 16 until July 16, inclusive, 7·7 inches of rain fell, this being distributed over 47 days, and 15 days only were recorded without precipitation. Throughout this period the mildew spread gradually in the plot, and by the middle of July 50 per cent. of the plants were infected, but at no time was the disease virulent on any of the varieties in the plot, and conidia were relatively scarce, being washed off almost as soon as formed. The harm done to this crop was negligible, and when the bulbs were pulled in the last week of July six plants only had one-fourth of their foliage killed by the disease, these being the worst.

In 1938 spring-sown onions were growing twelve yards distant from the above autumn-sown plants, with no intervening foliage or shade of any kind between the two plots. The first diseased plant in the spring-sown crop was found on July 19, when a single leaf was seen with conidia of the mildew on it. From July 20 until August 14 rain occurred on eleven days, the remaining fourteen days were dry, bright, sunny and warm, constituting the first summer weather experienced that year. From the time the disease was first found in these spring-sown onions the mildew spread and developed rapidly. By the middle of August the majority of these plants were diseased, some having 25 per cent. of their foliage killed, and 50 per cent. of the foliage of all varieties was killed by the fungus by the end of the month, every single plant being infected.

General observations on the Disease.—In other gardens under observation for the years 1931 to 1938, the appearance of onion mildew was usually in May on systemically infected plants of autumn-sown onions, the disease spreading from these to those sown in spring. The earliest date for its appearance on the spring-sown crop was July 19 during the eight-year period.

COOK (1) states, " The first signs of onion mildew on early infected plants is the production of conidiophores a short distance back from the tips of the older leaves." The same author found that yellowing followed closely the formation of the fungus fruiting-structures. These statements seldom apply to systemically infected plants of autumn-sown onions under the climatic conditions in these islands.

The discoloration on these plants which often precedes sporulation is entirely different from that which follows the production of conidia during the summer months, where fructification of the parasite is rapidly followed by discoloration, and more or less general collapse of the host cells over the area involved. The appearance of systemically infected plants in the spring is also quite distinct from the yellowing of the tips of the leaves of autumn-sown onions, which is so common a feature of this crop in the early spring months. This yellowing of the leaf tips is due to climatic conditions, and in exposed situations after harsh weather practically every plant may show yellowing, wilting and shrivelling of the top 1–2 inches of the foliage. In the case of systemically infected plants the discoloration is characteristic and once seen it will not readily be mistaken for something else. The oldest leaf, leaves, or whole of the infected plant appears as if coated with varnish, presenting a glazed yellowish appearance. So far from there being any collapse of the tissues the leaves are often abnormally turgid, frequently being curved out and downward beyond the normal angle of healthy leaves. Both of these characters may be present on infected plants or only one of them, and they are known to some of the practical growers who rogue out such plants.

This distinctive yellow discoloration is only seen in the spring, and the following appears to be an explanation of it. Previous to fructification there is usually an abundant development of the parasite in the palisade tissues of the host, practically every cell being invaded by two, three, or more haustoria. During mild intervals, which often occur in the spring in this climate, the fungus invades the palisade layers promiscuously in preparation for sporulation. Weather conditions change and conidia are not produced; the result is that the host tissues suffer from the excessive demands of the fungus. Though the cells become discoloured they are held in position by the mass of turgid mycelium amongst them and there is no general collapse for some time. If such infected leaves or plants are placed in a covered vessel fructifications generally appear over the whole of the discoloured area within a few hours.

During the period under review, apart from the record of the Botanic Gardens, in crops of onions sown in January or February in greenhouses or in hot-beds in frames and afterwards transplanted out, mildew was either entirely absent or it appeared late in the season when the crop was almost mature. The disease was seen on three occasions only in crops so raised, the dates for its appearance being July 28, 1931, August 31, 1934, and August 8, 1938. In the first year a single leaf of one plant only was diseased and examination of it showed the fungus to be local in this leaf, the remainder of the plant being free, thus pointing to aerial infection. On the second occasion when the disease was first observed a number of plants were producing conidia, but indications here also pointed to wind-borne spores as the source of infection, as none of the bulbs was invaded. If this disease is seed-borne it is a curious fact that it has never been recorded in seedling onions raised in greenhouses or in hot-beds in frames. In the latter, conditions as regards temperature and moisture are very favourable for the development of the parasite, and considerable quantities of onions are raised in this way every year.

In two years, 1932 and 1935, onion mildew was detected on "volunteer" plants growing on the site of the previous year's crop in a market garden. In 1932 it was seen on May 18 when fructifications were already present on several plants which were permeated throughout with mycelium. In the second year the disease was recognized by the discoloured appearance of the host on April 9 before the fungus had fructified, and incubation of this plant for a few hours gave conidia. In this last case the removal of all "volunteer" plants prevented the disease spreading, spring-sown onions in the same garden being harvested without a single mildewed plant appearing.

The Oospores.—As already mentioned, the sexual organs occur within the host tissues, being formed in the foliage and flowering shoots. They consist of an antheridium and an oogonium, the former a club-shaped body which grows up from the mycelium at the base of the more or less spherical oogonium and usually presses tightly against the wall of the latter. Fertilization takes place by the method common in Peronosporaceae, a definite tube growing out from the antheridium into the oogonium.

As a result of fertilization the oospore develops within the oogonium, but the oogonial contents are not all used in the formation of the oospore, and this unused material frequently imparts a reddish colour to the oospore when it is mature and still within the oogonium. The average diameter of the oospore is generally stated to be 31 μ, but it varies between the limits of 17 and 37 μ, and in some material examined, oospores of 31 μ in diameter have been very scarce, the majority measuring 28 μ, with numerous others only 25 μ.

There are circumstances in which very small oospores appear to be produced:

(*a*) When conditions are not favourable to the parasite within the host.

(*b*) Where enormous numbers of oospores develop.

When the latter occurs the fungus is evidently unable to obtain sufficient nutriment from the host for the proper development of those begun, and in this respect it resembles a fruit tree overloaded with fruit. As many as 1,176 oospores were counted in one square millimetre of a leaf, and this particular leaf was packed with them to a similar extent for a length of six inches. Where oospores are so numerous as this no arrangement of them can be made out (fig. 63C), but where leaves are met with containing relatively small numbers, the oospores are sometimes arranged in parallel rows or columns (fig. 63A and B), the adjacent tissue being practically free. In systemic infection or when plants become diseased when young, the hyphæ develop chiefly alongside the vascular bundles, often growing parallel with the veins of the leaf for several inches, invasion of the neighbouring tissues becoming more complete later on. It is on these older parts of the mycelium that the linear arrangement of oospores occurs.

As a rule the sexual organs are not formed in any quantity in those parts of the foliage where summer fructifications have been produced. They may be found in a separate portion of the same leaf, or leaves can be present which are full of oospores with scarcely a conidiophore on them, though others on the same plant may be covered from tip to base with the characteristic downy growth of conidiophores and conidia. Where the host cells are killed owing to the production of the summer fructifications, apparently the food reserves of the parasite are depleted and so not available for the development of the sexual organs. In such places I have only occasionally found traces of them, and then only when conidiophores were scanty. The presence of the oospores is frequently indicated by rusty, reddish-brown areas on the foliage, the tissues often becoming shrunken. As in the production of conidia so likewise in the formation of the oospores, their development is soon followed by the collapse of the host cells over the area involved, and where they are being freely produced the foliage dies prematurely.

In some seasons oospores form in enormous numbers, as many as 90 per cent. of the leaves of mildewed plants containing them, as was the case in 1930. In other years they do not appear to develop at all even though the disease is of long standing in the crop. In July 1931 considerable numbers were found in autumn-sown onions, being then fully formed, and they also occurred in September in 7 per cent. of the dead and dying leaves of a spring-sown crop. None could be found in 1932 or 1933, but in 1934 they again occurred in July in autumn-sown onions. Attention has already been drawn to the copious production of conidia which took place in 1933 and 1934. In 1933 when the crop was being pulled the dead foliage was collected, but careful examination of it failed to reveal a single oospore, and several hours' examination of the foliage at the end of the growing season in 1934 disclosed only two leaves with a few oospores in their tissues. In 1936 a few imperfect sexual organs were found in one leaf. In 1938 the disease was virulent in the spring-sown crop, rapidly destroying the leaves, and oospores were produced freely both in the foliage and in the flowering shoots of bolter plants. From this plot in the Botanic Gardens 25 per cent. of the dead leaves were found to contain oospores early in September. In the same year oospores occurred even more abundantly in foliage from other spring-sown crops, 60 per cent. of diseased leaves producing them.

Microscopical examination of onion foliage containing oospores shows the latter to present a yellowish or rusty-brown appearance. This coloration is due to the unused oogonial contents (fig. 63D), as the oospores are colourless when removed from their oogonia. The oospores are easily separated from the leaf by teasing out a small piece of tissue in a drop of water on a glass slide. When examined it is seen that each oospore is still enclosed in its oogonium, and by a slight manipulation of slide and cover slip the oogonium may be made to turn over so that excellent views of the oospore can be obtained. The oogonial wall is thin, smooth, and usually somewhat shrunken or folded. By prolonged immersion in water, or by treatment with dilute caustic potash, it becomes turgid, standing out from the spore (fig. 63E). The oospore is more or less spherical, possessing a smooth, uniform, thick wall, the thickness of the latter varying in different specimens from 3 to 4·5 μ.

MATERIAL FOR THE STUDY OF THE OOSPORES.

Owing to the abundant development of oospores in the year 1930 a unique opportunity occurred, and accordingly a sackful of diseased onion foliage containing oospores was collected and taken home. A large box had been prepared with holes in the bottom to facilitate drainage, and into this box the leaves were trampled. Owing to the bulk of foliage present and to the weather being showery and warm, bacterial action was very active, and the foliage soon went down into a soft mass. This eventually dried up, leaving a fairly fine, powdery material covering the bottom of the box to the depth of a couple of inches. This fine material consisted of foliage residue and abundance of oospores. An examination of it showed that nearly all the oospores were still enclosed by their oogonia, though an occasional one was free from its oogonium. The liberation of these odd oospores was no doubt due to the vigorous bacterial action which occurred during the decomposition of the leaves.

The upper part of the box was cut away to within six inches of the bottom, and the latter, containing the mass of oospores, has remained resting on the soil in a city garden since then. During these eight years a certain amount of dust and dirt has accumulated in the box also. The following observations and experiments were carried out with these oospores which were collected in 1930.

Changes occurring in the Oospores.—Investigation of the above material at the end of the first year showed the oogonium completely collapsed around the oospore (fig 64) A few oospores could still be liberated from their oogonia by gently rubbing them with the forefinger against the bottom of a watch glass. When they were thus released it was seen that there was no change in them, thick walls and one or more large oil drops being the characteristic features present as in the fresh material (fig 64).

By the end of the second year the majority of the oospores appeared darker, owing to the tightly shrunken, enveloping oogonia. Attempts now to make the oogonium swell up by prolonged immersion in water, or to liberate the oospore by rubbing against a watch glass ended in failure, the oogonium adhering to the unused oogonial contents which in turn were attached to the spore wall. The combined material thus provided an additional protective layer 2–3 μ thick around the oospore. Some oospores had a single large oil drop present, others several drops, and in a small number the oil was in a fine state of division, being distributed throughout the spore. The walls of the majority of the oospores were still 3 μ or more thick, but a few were seen with thin walls. In some the outer layer furnished by the oogonium was partly worn away (fig. 64).

When three years had elapsed it was apparent that quite a number of the oospores had their walls thinned down to 2 or 1·5 μ (fig. 65A–C), though the greater number presented little change. It was still rare to see oospores entirely free from their oogonia, ragged remains of it adhering persistently to the oospore wall.

By the end of the fourth year there was a decided change in most of the oospores; about 60 per cent. had their walls reduced in thickness to 2 μ or less. This was irrespective of whether the spores were free, partly free, or completely enveloped in the oogonial layer, the latter being the most numerous. Thinning of the oospore wall appeared fairly uniform all round in many specimens (fig. 65G, H), but numerous others were seen with the inner surface of their walls eroded unequally. About 20 per cent. of the oospores still appeared just as the majority did at the end of the first and second year (fig. 65D–F). It was plain, however, that in most of the oospores there had been a gradual thinning of the spore wall, and this reduction in thickness of the wall was either preceded or accompanied by internal changes in the spore contents. The most obvious change internally was the disappearance of the large oil drops which were so marked a feature in the fresh spores. The oil had either become broken up into minute droplets which were distributed throughout the oospore, giving the latter a somewhat granular look (fig. 65G), or the change had gone still further and the spore contents presented a homogeneous appearance (fig. 65H), being slightly turbid or pale yellowish in colour. A large oil drop was occasionally seen in spores with walls less than 2 μ thick, but this was exceptional, and in such cases the oospores were still quite hyaline.

During the periodical examinations twin oospores were seen repeatedly (fig. 65D), and on two occasions a group of three firmly joined together was seen. These unions appear to have been formed within the host plant and were not chance adhesions of oospores after the leaves decayed, because all attempts to separate the former combinations always ended in bursting one or more of the oospores, whereas those which became temporarily united in the mass of decayed material could be separated without difficulty.

In the summer months the spore material in the box was frequently dust dry, and at other times it was completely sodden with water for weeks together. From October 1930 until May 1938, inclusive, the temperature dropped below freezing point on 663 occasions; 289 times 5° of frost (F.) or more were registered; and 10° of frost (F.) or more were recorded on 62 occasions. The lowest temperature throughout the period was 12° F. on January 26, 1933. The conditions therefore, to which these oospores were subjected for over seven years were much worse than what would occur naturally, when the spores would be buried in the soil and protected to some extent. Consequently, in these islands, so far as any detrimental effects of climatic conditions on the oospores are concerned they are evidently of no importance.

The changes described for the oospores previous to germination are substantially the same as PETHYBRIDGE (8) records for oospores of *Phytophthora erythroseptica*. His observations were made on oospores produced in pure culture and nine months old. Under natural conditions a much longer resting period seems to be necessary for the oospores of onion mildew before they will germinate. It is probable that subsequent work may show that germination of some of the oospores of this parasite may occur before the time recorded in the present experiments. As has been mentioned, a few oospores were seen with thin walls and their oil in a fine state of division at the end of the second year. Judged in the light of results afterwards obtained it now appears likely that some, at least, of these were ready to germinate. While thinning of the oospore wall and internal changes go on together, the latter appears to be the most important, because some oospores with relatively thick walls (2μ) germinated, though others with thinner walls failed to do so under the same conditions. Instances were also seen where one only of twin oospores germinated.

Germination of the Oospores.—Preliminary accounts of this have already been published in Nature (4 and 5).

Germination was first observed when the oospores were four years old, and after a further interval of five months approximately 1 per cent. germination was obtained when the spores were placed in water and kept at room temperature for eleven days. Germination took place both in oospores enclosed within their oogonia and in those where the latter had disappeared (fig. 66A–E). In the first case the germ-tube burst its way out through the enveloping layer (fig. 66C). Where remains of the oogonium were still attached to the oospore wall germination was also observed, the germ-tube often pushing its way out through the adhering debris, and not arising on the clean side of the spore. When this happened the debris formed a collar around the germ-tube at its junction with the oospore, so that the union of the two could only be made out with difficulty.

After the lapse of five years germination had slightly increased, but the percentage was still low, around 2 per cent., though some of the oospores now germinated within 24 hours of being placed in water. However, by adding potassium permanganate solution 0·01–0·02 per cent. to water containing the oospores on microscopical slides 60–85 per cent. germination occurred inside 48 hours, 0·05–1 per cent. occurring in controls. Sufficient of the permanganate solution was added to the water on the slides to make it definitely pink. Oospores which were surrounded by dirt and organic matter germinated much more readily in this solution than those which were perfectly clean. Germination in all cases was by a stout germ-tube the thickness and branching of which was largely determined by the temperature the oospores were held at.

At the end of seven years practically all the oospores had their walls reduced in thickness, and it was exceptional to see one with its wall more than 2 μ thick. Germination now was in the neighbourhood of 5 per cent. in water in 48 hours at 20° C., and on addition of the permanganate solution 95 per cent. germination occurred under the same conditions of time and temperature. Once the vital changes reach a certain stage within the oospore oxygen appears to be the additional factor requisite for germination, as increase of germination was also secured with traces of hydrogen peroxide, 10 vols. diluted to 1/100–1/200. The results with this reagent, however, were never so good as with the permanganate of potash.

The absolute minimum and maximum temperatures for germination were not ascertained, but under the impulse of potassium permanganate solution and using oospores five years old, germination occurred at temperatures from 2° C.–26° C. inclusive, with the optimum around 20° C. A 2° C. germination of a few oospores only took place at the end of 3–4 days, the germ-tubes being relatively stout, 9 μ in diameter, and growth correspondingly slow. But even at this low temperature the germ-tubes increased by 200 μ in 48 hours. Below 10° C. germination was not obtained within two days, but from 10° up to 20° C. it occurred inside 24 hours, and at 26° C. a few oospores germinated inside 7 hours. Above 20° C. the germ-tubes were slender, vacuolated, and frequently branched, the main hypha reaching a length of from 1·5–2·5 millimetres in 24 hours with a basal diameter of 5–6 μ. Around 15° C. branching was not so prevalent and growth was not so rapid as at the higher temperatures, the diameters of the germ-tubes varying from 3–9 μ, with an average of 5–7 μ (fig. 67).

SUBSEQUENT GROWTH IN WATER AT 15°–20° C.

The germ-tube may develop into a single hypha with or without a few short branches (fig. 67), or it may give rise to two or three main branches just after emerging from the oospore (fig. 67). These main branches grow widely apart, and where only two occur growth is frequently in opposite directions, reaching a total length of from 2–8 millimetres in three days with a little subsidiary branching. Growth soon ceases, especially of the main hypha, and after this at any time up to the end of ten days a second type of branch, which is very short, arises usually on the main hypha and growing out practically at right angles to it (fig. 68). These short branches may be either scattered along the hypha or adjacent to each other, and they are terminated by a single cell (fig. 68). From three to nine of these bodies may occur on a hypha produced by a single oospore. The terminal cell is firmly attached to the stalk on which it is produced, and soon after its formation its colour, from being almost hyaline, changes to brown and finally to black, developing at the same time a somewhat warty coat (fig. 68). The average size of these bodies is 25 μ long by 18 μ wide; the limits of length being 21–31 μ, and of breadth 12–23 μ. Their stalks vary in length from 6–40 μ with an average of 17 μ, and they may possess one or more cross-walls (fig. 68).

The development of these bodies and the colour changes in them occur more rapidly when germinated oospores are kept at 20° C. than when oospores are germinated and held at lower temperatures. They appear to be in the nature of chlamydospores, and at the time of their formation the hypha on which they are being produced becomes practically empty. These bodies are probably the result of unfavourable environmental conditions, though further investigation may show them to be some stage in the life history of the fungus. Up to the present, however, no further development of them was seen though they were kept under continual observation for over three months.

In addition to septa occurring in the stalks of the above bodies, cross walls often develop elsewhere in the main hypha. The first septum is often formed near the base of the germ-tube (fig. 66) and it may be present inside 24 hours after germination; others develop at irregular intervals in the hyphæ, especially when the latter becomes old. The development of cross-walls is, however, very erratic.

ATTEMPTS TO CULTIVATE THE FUNGUS ON ARTIFICIAL MEDIA.

The sap was extracted from a medium-sized onion and strained through muslin to free it from the larger particles; 60 c.c of the fresh sap was added to 500 c.c. 2 per cent. glucose potato agar, and the media sterilized. Ordinary potato agar was prepared with a similar quantity of onion sap in the same way. Films of these media were spread on sterilized microscopical slides and allowed to cool. Oospores 5–6 years old were then sown in water on the prepared films, a little potassium permanganate solution added and incubation carried out in moist chambers at 15-20° C. Germination occurred readily on both media and growth was somewhat more vigorous than when in water alone.

On glucose potato agar plus the onion sap the germ-tubes varied from 8–11 μ in thickness and the resulting hyphæ reached a length of from 1·5–5 mm. in 24 hours, and from 4–10·5 mm. in 48 hours. The longest growth obtained was 1·5 centimetres in six days

On potato agar plus onion sap films the diameters of the germ-tubes varied from 7–9 μ, and growth was not so vigorous as on the other media. In addition, there was a greater tendency for the hyphæ to branch, sometimes in a tree-like manner.

In neither case was there any attempt at chlamydospore-formation such as occurred when the oospores germinated in water.

While the amount of success was very limited these attempts are hopeful in that eventually a method of growing this fungus on artificial media may finally be evolved.

CONCLUSION.

In old gardens which have been under vegetable cultivation for many years onion mildew is generally very severe, the disease appearing early and usually with unfailing regularity every year.

Most writers on this disease have recommended that three years should elapse before onions are again planted on ground which has borne a diseased crop, the assumption being that any oospores which were in the soil would have germinated during that time. The recommendation is evidently a good precautionary measure, but it is apparent from the facts presented in the present paper that greater danger is to be apprehended from oospores after the lapse of three years rather than sooner. Oospores are not formed in mildewed plants every year, but one year's crop of them may contaminate the soil for a long period—exactly how long is not known.

Wherever onion mildew occurs, all foliage should be raked off and burned, or otherwise destroyed, and on no account should diseased foliage be allowed to get into either the manure or compost heap.

Several points in the life history of this fungus still require elucidation, an important one being the method of infection of the host plant by the oospores or their products, and research on this is being continued. Though the full story is not yet complete, owing to the length of time the present investigation has been under way it appeared desirable at this stage to record in detail such facts as are fully known.

ACKNOWLEDGMENT.

To Mr. J. W. BESANT, Keeper of the Botanic Gardens, Glasnevin, Dublin, I am indebted for many facilities during the past eight years,

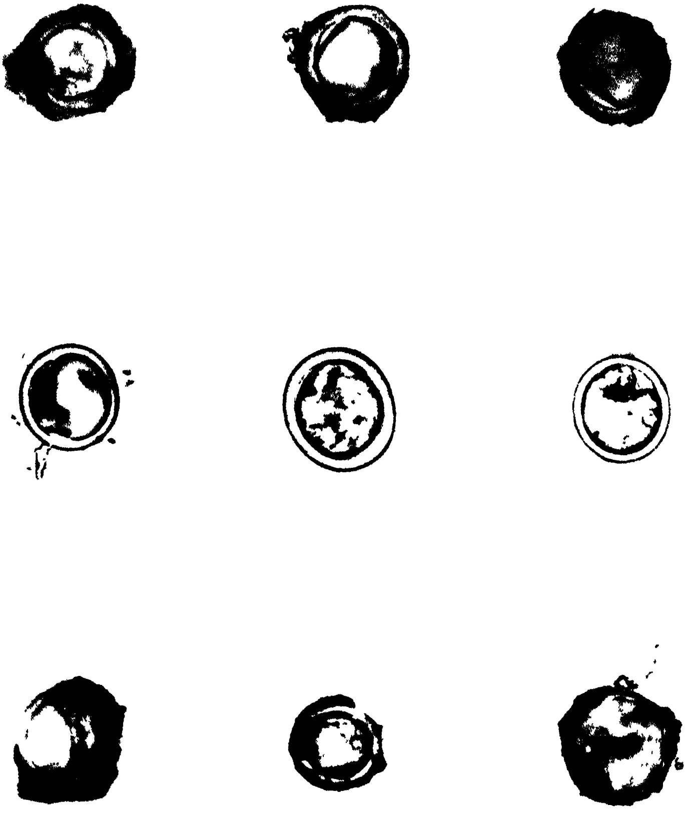

FIG. 64. OOSPORES OF PERONOSPORA SCHLEIDENIANA 430

Top row one year old with layer formed by collapsed oogonium. Second row same age, with oogonium layer removed. Third row two years old.

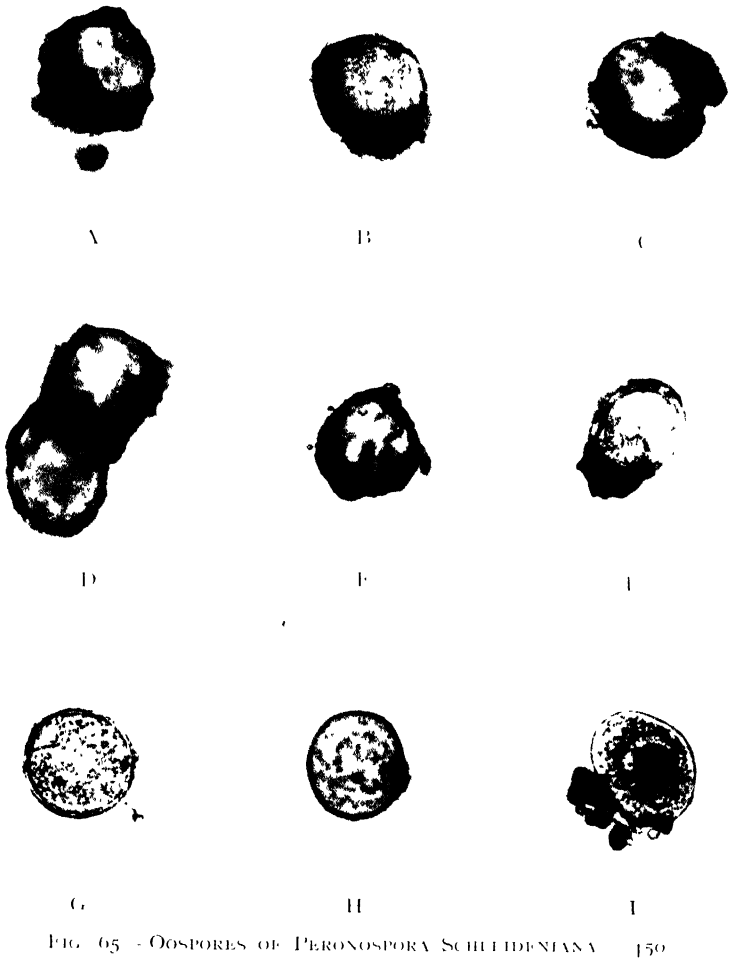

FIG. 65.—OOSPORES OF PERONOSPORA SCHLEIDENIANA. ×150.

A–C, appearance of some oospores at end of three years (walls thin). D, Twin oospore four years old. E–F, Four-year old oospores with thick walls. G–I, Four-year old oospores with thin walls, the oogonia having practically disappeared.

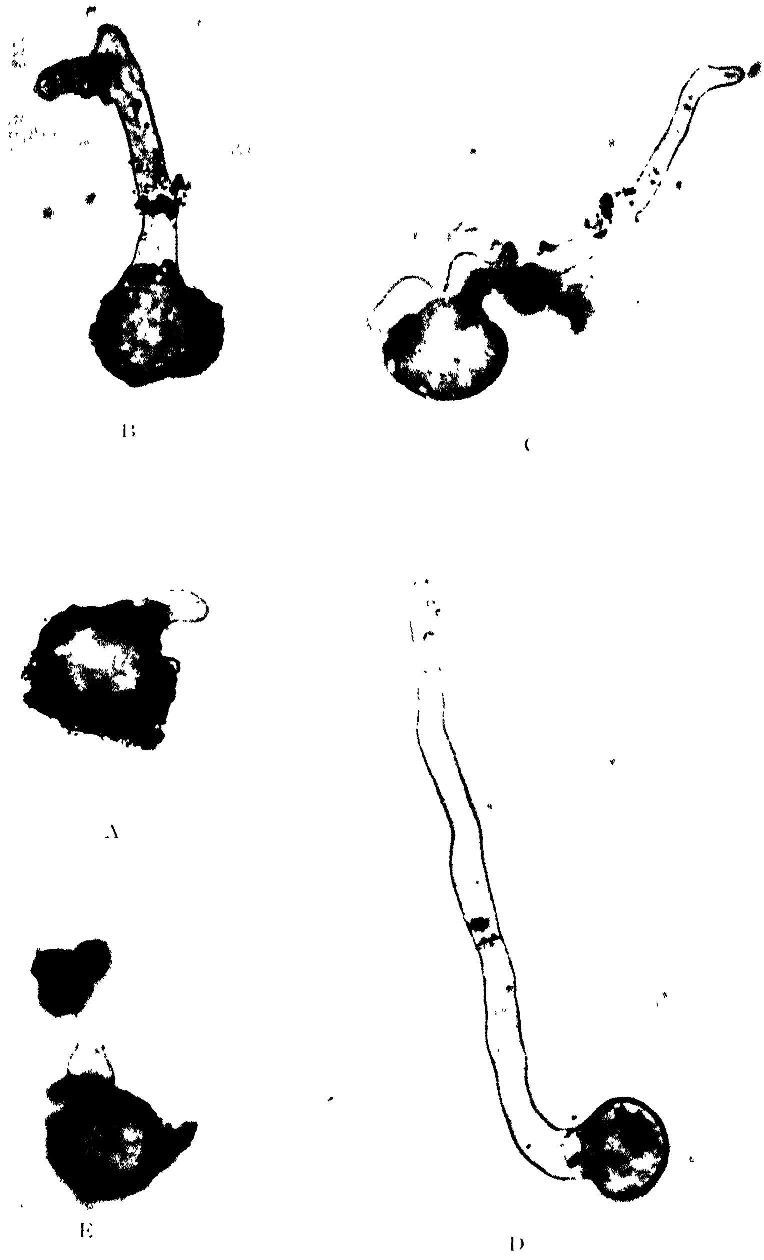

FIG. 66.—GERMINATING OOSPORES OF PERONOSPORA SCHLEIDENIANA 150

A, early stage; the germ tube has burst through wall of collapsed oogonium. B, slightly later stage. C, Germ tube forming a second branch. D, a thin-walled oogonium (like C) germinating. E, Septum at base of germ tube.

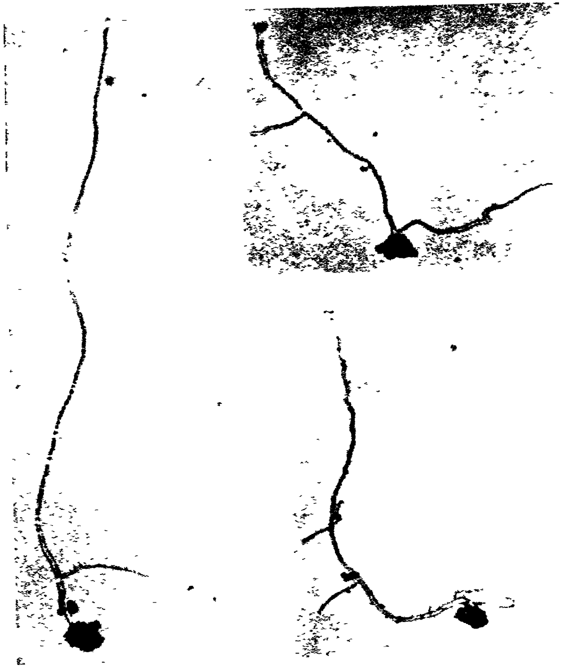

FIG. 67.—TYPES OF HYPHAE PRODUCED IN 48 HOURS AT 15-20° C., FROM FIVE YEARS OLD AND WEATHERED OOSPORES.

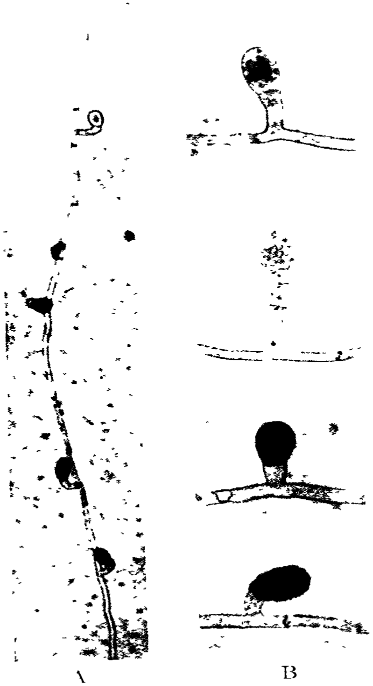

FIG. 68.—A, HYPHA NINE DAYS AFTER GERMINATION OF OOSPORE × 150. B, STAGES IN DEVELOPMENT OF BODIES ON HYPHAE × 150.

[*To face p.* 285.

not only with regard to examination of onion plants, but also for all the weather records included in this paper.

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PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Cymbidium × 'Swift' var. 'Delight.' **A.M.** April 18, 1939. A charming addition to the genus. The spike bore seven well-formed flowers of large size, blush white with pink suffusion. The result of crossing *C.* × *Alexanderi* with *C.* × 'Godwit.' Exhibited by Sir William Cooke, Bart., Hampstead Norris, Newbury.

Epigaea 'Aurora.' **A.M.** March 28, 1939. From Mr. W. J. Marchant, Wimborne. One of the hybrids between *E. asiatica* and *E. repens* and of similar habit but more vigorous and free-flowering. The flowers are pale pink and are carried in corymbose racemes.

Fritillaria Ehrhartii. **A.M.** March 28, 1939. From Dr. P. L. Giuseppi, Trevose, Felixstowe. Introduced from Greece by Mr. M. Ogilivie-Grant in 1938. The plants are up to 11 inches tall with one or occasionally two nodding flowers on a stem, each 1 inch across and 1 inch deep, greenish yellow within, lined brownish purple, with blue bloom without. The tips of the petals are yellowish green. The lower two leaves are ovate and lanceolate and the upper leaves narrowly lanceolate.

Fritillaria macrandra. **A.M.** March 28, 1939. From Dr. P. L. Giuseppi. Introduced by Mr. M. Ogilvie-Grant in 1938. Stem one-flowered. Flower 5½ inches tall, at first held horizontally and later nodding, up to 1¼ inch broad and ¾ inch deep. The flower greenish yellow inside, the lower half spotted dark crimson, outside greenish yellow at the apex and deep maroon on the lower part of the petals with a slight bluish bloom. The leaves are ovate and lanceolate, up to 2 inches long and ¾ inch broad.

Fritillaria tuntasia. **A.M.** March 28, 1939. From Dr. P. L. Giuseppi. A hardy plant for the rock garden introduced from Greece by Mr. M. Ogilvie-Grant in 1938. The plant is 9 inches high with one or two nodding flowers on a stem, each 1¼ inch across, deep purplish crimson, sometimes greenish yellow at the base within and with a grey-blue bloom without. The leaves are glaucous green, the upper about 2 inches long narrow and lanceolate, the lower more ovate and up to 3¾ inches long.

Hippeastrum 'E. Humphris.' **A.M.** April 18, 1939. From R. F. W. Cartwright, Esq. (gr. Mr. E. Humphris), Aynho Park, Banbury. An excellent white variety of good form, with a tinge of green at the base of the segments.

Magnolia mollicomata. **F.C.C.** April 4, 1939. From Lord Aberconway, C.B.E., V.M.H., Bodnant. A magnificent species collected by Forrest at altitudes between 8,000 and 12,000 feet in Yunnan and S.E. Tibet. In nature it forms a deciduous large shrub or a tree as much as 80 feet in height, and has broadly elliptic or oblong-obovate dull green leaves six to ten inches long. This species shows strong affinity with *M. Campbellii*, but differs from a horticultural point of view in its more compact habit and in producing its later and more abundant flowers within 12 years from seed, whereas the Himalayan species rarely flowers within 30 years from seed. The flower of *M. mollicomata* is most handsome. The petals are arranged in three whorls of four, the outer 4¼ ins. long by 2½ ins. broad, and enclose a large cluster of buff-tipped, violet stamens. The colour of the outside of the petal is a pale tint of petunia purple (Horticultural Colour Chart 32/3) passing to orchid purple (31/2) at the base. Internally the petal is flushed with the palest tints of mallow purple (630/3).

Narcissus 'Blarney.' A.M. April 20, 1939, as a variety for exhibition. An attractive bicolor Barrii variety (Division 3b) with flower 4 inches in diameter, well poised on stout 22-inch stems. The perianth segments were white, the outer ones being nearly 1⅞ inch long and 1⅜ inch broad. The saucer-shaped pleated corona was chrome yellow, edged with primrose ; $\frac{9}{16}$ inch long, and 1⅜ inch in diameter. Raised and shown by Mr. J. L. Richardson.

Narcissus 'Brunswick.' F.C.C. April 4, 1939, as a variety for exhibition. This attractive giant Leedsii variety (Division 4a), raised by the late P. D. Williams and shown by Mr. J. L. Richardson, Prospect House, Waterford, received **A.M.** on April 4, 1934. See JOURNAL R.H.S., **59**, p. 485.

Narcissus 'Cantatrice.' A.M. April 13, 1939, **F.C.C.** April 20, 1939, as a variety for exhibition. A well-formed white giant Leedsii variety (Division 4a) with flowers just over 4½ inches in diameter, borne on 15-inch stems. The smooth, rather pointed segments were 2 inches long, the outer ones being just over 1½ inch broad. The corona was about 1⅞ inch long and 1½ inch in diameter at its slightly expanded mouth. Raised and shown by Mr. Guy L. Wilson.

Narcissus 'Corinthian.' A.M. April 13, 1939, as a variety for garden decoration and for cutting from the open for market, after trial at Kirton. Sent by Messrs. Seymour Cobley. A yellow Trumpet (1a) variety, raised by Mr. P. D. Williams.

Narcissus 'Greeting.' A.M. April 4, 1939, as a variety for exhibition. A large bicolor Incomparabilis variety (Division 2b) with flowers over 4¼ inches in diameter, well poised on stout 20-inch stems. The white perianth segments were smooth, broad and overlapping, the outer ones being about 1⅞ inch long and nearly 1¾ inch broad. The cup-shaped canary-yellow corona was about ⅞ of an inch long and nearly 1⅜ inch in diameter at the mouth. Raised by the late P. D. Williams and shown by the Trenoweth Valley Flower Farm, St. Keverne, Cornwall.

Narcissus 'Helford.' A.M. March 9, 1939, for market, after trial at Gulval. A deep yellow self-coloured Trumpet (1a), with grey-green foliage. Flowers on 19-inch stems, well poised, 3⅘ inches diameter. Segments overlapping and slightly twisted. Trumpet $1\frac{7}{10}$ inch long, 1½ inch wide, deep golden-yellow, straight, margins slightly serrated and neatly rolled back. Increase very good (1937, 9 flowers ; 1938, 35 ;

1939, 52). Raised by Mr. P. D. Williams and sent by Mr. M. P. Williams of Lanarth, St. Keverne.

Narcissus 'Pepys.' **A.M.** April 13 1939, as a variety for exhibition. A striking bicolor *cyclamineus* hybrid (Division 6) with flowers nearly 3½ inches in diameter, borne on 14-inch stems. The white perianth segments, which were somewhat reflexed and rolled inwards, were 1½ inch long and nearly an inch broad. The sulphur-yellow, cylindrical corona was about 1½ inch long and nearly 1 inch in diameter at its indented margin. Raised by the late P. D. Williams and shown by Mr. J. L. Richardson.

Narcissus 'Porthilly.' **A.M.** April 13, 1939, as a variety for garden decoration and for cutting from the open for market, after trial at Kirton. Sent by Mr. J. L. Richardson. See JOURNAL R.H.S., **59,** p. xlvii.

Narcissus 'Scapa.' **A.M.** April 13, 1939, as a variety for exhibition. A white Trumpet variety (Division 1b) with flowers 4½ inches in diameter, well poised on 18-inch stems. The smooth perianth segments were 1⅞ inch long, the outer ones being 1¾ inch broad. The corona was just 1⅞ inch long, and just over 1¾ inch in diameter at its frilled and expanded mouth. Raised by The Brodie of Brodie and shown by Mr. J. L. Richardson.

Narcissus 'Slemish.' **F.C.C.** April 20, 1939, as a variety for exhibition. This giant Leedsii variety (Division 4a) received an **A.M.** on April 16, 1935. (See JOURNAL R.H.S., **60,** p. 274.) Raised by Mr. Guy L. Wilson and shown by Mr. J. L. Richardson, Prospect House, Waterford.

Narcissus Watieri. **A.M.** April 4, 1939, as a plant for the alpine house. This dainty white-flowered species was shown by Mr. G. P. Baker, Hillside, Oakhill Road, Sevenoaks, who collected it in the High Atlas. The plant received a **B.C.** on March 7, 1933. See JOURNAL R.H.S., **59,** p. viii.

Odontioda × 'Ishtar.' **A.M.,** April 4, 1939. This pretty hybrid bore a spike of 14 flowers, rich crimson-red in all the segments, the whitish column shaded with rose, the labellum with a yellow crest. Obtained by crossing *Odontioda* × 'Monica' with *Odontioda* × 'Diana.' Exhibited by E. Kenneth Wilson, Esq., "Cannizaro," Wimbledon.

Primula Clarkei. **A.M.** March 28, 1939. From Mrs. Crewdson, Helme Lodge, Kendal, and R. B. Cooke, Esq., Kilbryde, Corbridge, Northumberland. An almost stemless, hardy plant for the rock garden from Kashmir. The flowers are up to ¾ inch across, with bright pink deeply bifid petals. The leaves are small and kidney-shaped about ½ inch diam. and sharply serrate. (See JOURNAL R.H.S., **63,** p. 485.)

Rhododendron × 'Eurydice.' **A.M.** April 18, 1939. Shown by Lionel de Rothschild, Esq., V.M.H., Exbury, Southampton, as a hardy flowering plant for the woodland garden. A cross between *R. arboreum album* and *R.* × *Loderi*, with well-formed trusses up to 6½ inches broad by 6 inches deep of about fifteen large funnel-shaped flowers delicately tinged with pale rosy-pink with a crimson blotch within. The oblanceolate sharply pointed leaves are glabrous on both sides, dark green above, paler below.

Rhododendron × ‘Gaul.’ **A.M.** April 18, 1939. Shown by Lionel de Rothschild, Esq., V.M.H., as a hardy flowering plant for the woodland garden. The result of crossing *R Elliottii* and *R.* × *Shilsonii.* The compact truss contained about twenty narrowly funnel-shaped deep red flowers, the corolla up to 2 inches broad by 1¾ inches deep, the cup-shaped scarcely lobed calyx of the same colour. The broadly ovate glabrous leaves are dark green above, paler below.

Rhododendron × ‘Little Bert.’ **A.M.** April 18, 1939. A cross between *R. euchaites* and *R. repens* ♀, sent by C. R. Scrase-Dickins, Esq., V.M.H., Coolhurst, Horsham, Sussex, as a flowering plant for the rock-garden or alpine house. A plant about 1 foot high was shown bearing on the ends of its branches numerous clusters of four or five nodding, shining, crimson-scarlet flowers, up to 2 inches across by 1½ inch long, bell-shaped with spreading lobes. The elliptic-ovate, obtuse, mucronate leaves, rounded at each end, are up to 3 inches long by 1½ inch broad. A lovely plant both in habit and flower.

Rhododendron microleucum. **F.C.C.** April 18, 1939. Sent by Lionel de Rothschild, Esq., V.M.H., Exbury, Southampton, as a flowering plant for the rock-garden or alpine house. A low bush about 1 foot high bearing many clusters of wide-open white flowers up to ¾ inch across borne in threes on the tips of the branches. The leaves are rather thin, scaly below, about ½ inch long and ⅕ inch or less wide, ovate-oblong.

Rhododendron × ‘White Wings.’ **A.M.** April 18, 1939. Sent by C. R. Scrase-Dickins, Esq., V.M.H. A hybrid between *R. bullatum* and *R. ciliicalyx,* with loose trusses of three or four widely funnel-shaped flowers 4½ to 5 inches wide by 2½ inches deep, pure white with a small greenish-yellow blotch at the base, within; leaves ovate-lanceolate, rugose and dark green above, pale green and thickly scaly below, coarsely ciliate.

***Schizanthus ‘Cherry Shades.’** **A.M.** April 14, 1939. Raised and sent by Messrs. Carters Tested Seeds Ltd., Raynes Park, S.W. 20. Plant of compact habit, 15 to 18 inches tall, free-flowering. Flowers 1½ inch diameter, of good form, shades of Rose-madder (H.C.C. 23), upper petal blotched Aureolin (H.C.C. 3/2), lined with shades of Rose-madder.

Soldanella montana. **A.M.** April 4, 1939. From Frank Barker, Esq., Onosma, Stevenage, Herts. Leaves small, kidney-shaped, leathery, dark green. The lilac-blue flowers, nodding on stems 3 to 6 inches high, are bigger than those of *S. alpina* and the leaves are larger, more deeply cordate and distinctly crenate at the edges.

* After trial at Wisley.

THE AWARD OF GARDEN MERIT.—XLIX.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

247. CAMPANULA LATILOBA.

Award of Garden Merit, July 6, 1936.

Campanula latiloba is related to the well-known *C. persicifolia* and is a native of Asia Minor. It is a good perennial and makes a number of shoots around the main one so that the ground is soon covered with glabrous leaves from 3 to 5 inches long and about ½ inch wide. The erect unbranched flower stems bear coarsely-toothed leaves wider than those of *C. persicifolia*, reach 15 or 18 inches in height, and carry a number of stalkless broadly bell-shaped flowers similar to those of *C. persicifolia*, about 2 inches across, generally blue, often very deep blue, but sometimes white. Ordinary good garden soil suits it and it is easily propagated by division or by seeds.

When FISCHER distributed the seeds nearly a hundred years ago from the St. Petersburg (as it then was) Botanic Garden he called the plant *C. grandis* and by that name it has been widely grown and is still often known. It was afterwards recognized as identical with the plant DE CANDOLLE had already described as *C. latiloba*, and by his name alone it must therefore be called, however much it may, in comparison with many forms of *C. persicifolia*, merit the name 'grandis.'

It is figured in colour in Paxton's Magazine of Botany, vol. x, p. 31.

248. MAGNOLIA HEPTAPETA.

Award of Garden Merit, June 8, 1936.

The name at the head of this note will probably be strange to most of those who read it, but the plant to which it is attached is no newcomer to our gardens, but one introduced from China in 1789, and it had been cultivated there for certainly over a thousand years before it reached our shores. It was indeed one of the first of its genus to reach England from Asia. It was for long rather a rare tree here, but now it is easily obtainable grafted on layers of *Magnolia* × *Soulangiana* of which it is one of the parents.

Few Magnolias have had so many botanical names, and two at least of those given it are well known—*M. Yulan* given it by DESFONTAINES in 1809, under which name it was figured in the Botanical Magazine, t. 1621, and *M. conspicua* as it was called by SALISBURY in 1806. In addition to these CORRÉA called it *M. precia* in 1803, and DESROUSSEAUX *M. denudata* in 1791, by which name it has recently been referred to in some books and catalogues. It was thought to be the earliest botanical name to be applied to the tree but recently Mr. DANDY has pointed out that BUC'HOZ published an illustration of the tree in Plantes nouvellement découvertes, a rare book published in 1779, a copy of which is in the Lindley Library, with the name *Lassonia heptapeta.* The earliest specific epithet therefore appears to be *heptapeta* and the name by which it must be known in accordance with the rules of botanical nomenclature is *M. heptapeta.*

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* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title Some Good Garden Plants. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. 63, pp. 190, 246, 448 and 546; 64, pp. 134 and 232.

If appropriateness were the criterion for naming instead of priority, *conspicua*, the name given by SALISBURY, would certainly be the one to hold the field, for the tree is the most conspicuous one in our English gardens in March or April when its great flowers stand like pure white globes at the tips of all the branches. They are the more conspicuous because they come before the leaves, and the buds from which they come are conspicuous all through winter owing to the large grey shaggy scales that enclose them. A few warm days in February and March bring the flowers out and this precocity is a drawback, for too often frost comes and destroys the beauty the buds have invariably promised.

The tree itself is hardy enough and will grow well in good soil containing leaf-mould, and moist but well drained. Such a tree needs space and, if it can be contrived, shelter as well as sun—shelter to protect the flowers as well as may be, and sun to ripen up the wood and enable the buds to mature.

The leaves are oval or sometimes widest above the middle, from three to six inches long and rather more than half as wide, downy beneath. The flowers have nine sepals and petals about equal in size, thick, pure white, three inches long, upright until towards the end of their life when they spread.

The tree reaches the size of a large standard apple tree and like that makes a rounded head of many branches.

249. ASTER × FRIKARTII.

Award of Garden Merit, October 4, 1937.

It was a happy thought to cross those two good Asters, *Aster Thomsonii* from the Himalaya with *A. Amellus*, a native of Italy. We owe the cross to Switzerland, where Monsieur FRIKART made it about twenty years ago, and gave it to gardens under the name *Aster × Frikartii.* Three or four varieties were produced, the best known of which is 'Glory of Stäfa,' and this is possibly the only one now grown. It combines characters from both parents, much of the stiff upstanding habit (needing no stakes) and branching of *A. Thomsonii*, with larger bluish flowers and more of them. The flowering time is early August and it continues for weeks. It needs only a sunny well-drained site and as it does not spread far underground it is suited for small borders as well as large. It is easily propagated by cuttings of young growths taken in spring and rooted in a frame. The variety 'Glory of Ståfa' was given the Award of Merit after trial at Wisley in 1925, having been sent by Mr. RUYS of Dedemsvaert.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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FORTHCOMING EVENTS.

CHELSEA SHOW.

THE Chelsea Show, in spite of the very inclement weather, was very well attended, and certainly must have been enjoyed by all those who braved the rain. The flowers have never lasted so well or looked so fresh at the end of the exhibition.

Her Majesty Queen Mary, Their Royal Highnesses the Duke and Duchess of Gloucester, His Royal Highness the Duke of Kent, Her Royal Highness the Princess Alice and the Earl of Athlone honoured the Society with their presence.

This occasion may be recorded in the annals of the Society as the Tulip Chelsea, for Tulips have seldom been so numerous and so well shown, and the highest award fell to a superb exhibit of these flowers.

The new arrangements for exit were a great success and were undoubtedly appreciated, judging from the commendatory correspondence received.

The Council wishes to express its gratitude to all the exhibitors, to the members of the Committees who assisted in judging, and to the Fellows and their friends who by coming in such numbers all helped to make the Show a success.

The particulars of the awards made at Chelsea will be found on pp. lxxxviii–xcvi.

CALENDAR.

The particulars of the first Fortnightly Show of July, on July 4 (12 noon–7.30 P.M.) and 5 (10 A.M.–5 P.M.), were given in the June number of the JOURNAL.

On July 18 (12 noon–7.30 P.M.) and July 19 (10 A.M.–5 P.M.) there will be a Fortnightly Show at which there will be two competitions; the first being a Lily Competition for amateurs, the classes of which are as follows:

Class A.—3 hybrids of Lilium, 1 stem of each, cut or on a plant.
First prize, £1 10*s.*; Second, £1; Third, 15*s.*

Class B.—1 stem of Lilium cut or on a plant.
First prize, £1; Second, 15*s.*; Third, 10*s.*

The second competition is the annual competition for the Clay Challenge Cup for the best-scented Rose. The particulars of this competition will be found on p. 32 of the January JOURNAL.

Entry forms for these competitions are obtainable from the Secretary.

The National Carnation and Picotee Society will hold its annual show in the Old Hall on July 18 (1–7.30 P.M.) and 19 (10 A.M.–5 P.M.).

At 3.30 P.M. in the Lecture Room of the New Hall on July 18, Mr. A. A. Fincham will lecture on "Fuchsias." An invitation to hear this lecture has been extended to Members of the Fuchsia Society.

On July 19, at 3.30 P.M. in the Lecture Room, an informal talk on "Some Plants in the Show" will be given by Mr. W. M. Campbell.

On July 19 and 20 (2–4 P.M.), weather permitting, a demonstration will be held at Wisley on the Summer Pruning of Fruit Trees. Fellows wishing to attend this demonstration should inform the Director of the Gardens beforehand, mentioning the day.

A Fortnightly Show will be held on August 1 (12 noon–7.30 P.M.) and 2 (10 A.M.–5 P.M.).

At 3.30 P.M. on Tuesday, August 1, an informal talk on "Some Plants in the Show" will be given by Mr. M. Haworth-Booth.

At the Fortnightly Show on August 15 (12 noon–7.30 P.M.) and 16 (10 A.M.–5 P.M.) there will be a competition for the Foremarke Challenge Cup, which is offered for twenty spikes of named Gladioli in not fewer than ten varieties and not more than two spikes of any one variety. This competition is open to trade and amateur growers.

There will also be a competition for Gladioli, the classes for which are as follows:

Class A.—6 varieties of large-flowered Gladioli, 1 spike of each. Other things being equal, preference will be given to the exhibit with the largest number of open flowers.

Class B.—6 varieties of large-flowered Gladioli, 1 spike of each. Other things being equal, preference will be given to the exhibit with the largest individual flowers.

In each of these classes the prizes will be:

First prize, Silver Flower Bowl, presented by Mrs. H. W. Hall.

Class C.—6 varieties of *primulinus* Gladioli, 1 spike of each.
First prize, £1 10*s.*; Second, £1; Third, 10*s.*

Entries for these two competitions must be made on special forms obtainable from the Secretary, to whom the completed forms must be returned not later than by the first post on Wednesday, August 9.

On August 23 and 24 (2 P.M.–4 P.M.), weather permitting, there will be a demonstration at Wisley on the Vegetative Propagation of Plants. The Director of the Gardens will be glad to know of those desiring to attend this demonstration at an early date.

A Fortnightly Show will be held on August 29 (12 noon–7.30 P.M.) and 30 (10 A.M.–5 P.M.).

On the same days and at the same times the Alpine Garden Society will hold its show in the Old Hall.

At 3.30 P.M. in the Lecture Room on August 29, an informal talk on " Some Plants in the Show " will be given by Mr. C. T. Musgrave, V.M.H.

General Examinations.

The following are the results of this year's General Examinations held on March 9, 1939.

Seniors.

Eight hundred and eleven candidates entered for this Examination, and of these

9 were placed in Class 1.
105 ,, ,, ,, ,, 2.
270 ,, ,, ,, ,, 3.
385 candidates failed.
42 were absent.

A Silver-gilt Medal is awarded to Mr. Robert William Rennison, of 38 Baxter Avenue, Southend-on-Sea, who was First.

Juniors (under 18).

Two hundred and seventeen candidates entered for this Examination, and of these

11 were placed in Class 1.
50 ,, ,, ,, ,, 2.
96 ,, ,, ,, ,, 3.
52 candidates failed.
8 were absent.

A Silver Medal is awarded to Mr. Harold Donovan Tindall, of 50 Holbrook Lane, Foleshill, Coventry, Warwickshire, who was First.

British Diploma of Floral Art.

At the Society's Spring Examination for the Floral Art Diploma, which was held on April 26–27, five Diplomas were awarded to the following successful candidates:—Miss Gwendoline Norah Bedford, Miss Norah Denham, Miss Emily Louise Gough-Cooper, Miss Alethea Robson and Miss Rosemary Constance Curnock.

The Autumn Examination for this Diploma will be held in the Society's Hall on September 21 and 22.

The syllabus and particulars of the examination can be obtained from the Secretary.

AUTUMN SHOW.

As already announced, arrangements have been made to hold an Autumn Show at Earls Court on Wednesday, Thursday and Friday, September 13, 14 and 15, and as this event does not appear on the tickets nor in the January JOURNAL calendar, the Fellows and Associates are particularly asked to make a note of it in their diaries so that *it may not be overlooked. The schedules for the Show may be had on* application to the Secretary.

RHODODENDRON CONFERENCE.

The Rhododendron Conference, which the Society is holding in conjunction with the Rhododendron Association, will take place in 1940 on May 7, 8 and 9, and arrangements for the programme are progressing satisfactorily. The programme will contain such subjects as: Rhododendrons in the wild, geographical distribution, and story of discovery of Rhododendrons; Modern Rhododendron Hybrids and their uses in the Garden; Propagation; Greenhouse Rhododendrons; Hardy hybrid Rhododendrons, their cultivation in country and town; and Rhododendron species in a cold situation, etc.

Concurrently with the Conference there will be a three-day Rhododendron Show with competitive classes. Visits to gardens will also be arranged.

Fuller details of the programme will be published from time to time in these notes, but Fellows interested in Rhododendrons are asked to notify the Secretary so that their names may be registered.

THE SEVENTH INTERNATIONAL CONGRESS OF GENETICS.

The Seventh International Congress of Genetics will be held in Edinburgh, Scotland, from August 23 to 30, 1939, and any Fellows who are interested in this subject, and desire to take part in the Congress, are invited to apply to the General Secretary, Professor F. A. E. Crew, F.R.S., Institute of Animal Genetics, West Mains Road, Edinburgh, 9, Scotland.

COLORADO BEETLE.

The Minister of Agriculture asks that notice may be drawn to the Colorado Beetle.

The situation on the Continent in 1938 was more serious than in any previous year. The Colorado Beetle is now known to exist not only in France, Germany, Switzerland and Luxemburg, but migratory flights from France have taken place over Belgium and reached Holland, and given favourable weather the direct invasion of this country is possible.

The Ministry of Agriculture is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes or any red or reddish-yellow grub that is found feeding upon potato leaves should be regarded with suspicion. When suspected Colorado Beetles or grubs are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of potato leaf, and the box should be sent to the Ministry of Agriculture, 10 Whitehall Place, London, S.W. 1, with a letter stating the exact place where the insects were caught and the name and address of the finder.

Wisley in July.

Amongst the standard collections and trials which flower during this month are the Border Carnations and Pinks, Delphiniums, Sidalceas, Sweet Peas, *Scabiosa caucasica* varieties, early Gladioli, the annual Godetias and Dimorphothecas, and finally the Roses along the wide walk which traverses the hillside. This is therefore a particularly good time for those who are interested in any of these groups of plants to visit the Gardens and see the many varieties growing under identical conditions of cultivation.

In the Alpine house the genus Campanula is especially to the fore, and many species will now be found in flower, including *C. lasiocarpa*, *C. Zoysii*, *C. Waldsteiniana*, and the pretty little hybrid *C.* × *rotarvatica*. Besides these should be mentioned the Japanese *Conandron ramondioides*, *Gilia californica*, *Nierembergia frutescens* with an unusually long flowering season, *Thalictrum kiusianum*—a dwarf species from Japan—and the bushy dwarf *Verbascum spinosum* so unlike the other herbaceous members of its family.

Beside the Alpine house are the collections of Cistus species, their close relatives the Halimiums with yellow or sometimes white flowers, and the brilliant Gazanias in coppery-red or yellow tones.

On the rock garden are growing an even larger assortment of Campanulas, including *C. Tomasiniana*, *C. arvatica*, and *C. pulloides*; Codonopsis species, *Cyananthus lobatus*, with rich blue Periwinkle-like flowers, several sorts of Primulas, such as *Primula. alpicola* and *P. Littoniana*, the brilliant red *Lychnis Arkwrightii*, and *Anagallis collina* from Morocco, besides very many other useful and ornamental rock plants. Along the margin of the long pond at the foot of the meadow *Iris Kaempferi* is in full bloom, showing the variation in shape and colour of which this species is capable.

Under the shade of the Oak trees in the Wild Garden the Lilies are coming into flower—the Californian *Lilium pardalinum*, the Chinese *L.*

Davidi Willmottiae, and the splendid sealing-wax red of *L.* × 'Maxwill.' Colour is also provided by the purple spikes of *Orchis foliosa*, at least in the earlier part of the month, by the pale pink plumes of the Astilbes, and by groups of *Primula Florindae* along the side of the ditch on the northern boundary, where their soft yellow blends with the pale blue of *Campanula lactiflora.* Large plantings of the white-belled *Campanula latifolia* var. *alba* are also grown in this part of the Gardens and lighten a shady corner.

Of the shrubs in Seven Acres the Cotoneasters, Escallonias, many of the hybrid Philadelphus, with the yellow *Spartium junceum*, *Hypericum patulum*, and *Senecio laxifolius* are in bloom this month, as well as the Water-Lilies in the pond.

In the Heath garden the Connemara Heath (*Daboecia polifolia*) opens the season of the summer-flowering Heathers with its large purple bells ; accompanying members of the Erica family are the various forms and hybrids of *Erica Tetralix*, the Cross-leaved, and *E. cinerea*, the Bell-Heather.

Visitors who walk along the river bank will find in Howard's Field many examples of Rosa species and of the old-fashioned Roses, to both of which groups additions have been made during the past planting season. Here also are specimen plants of a good number of Cistus species and hybrids, besides Halimiums, which flourish on the sandy soil. The return may be made through the Pinetum, and thence either by the herbaceous border or by the collection of plants which have received the Award of Garden Merit, to the glasshouses.

Some excellent plants will be found in flower in the Award of Garden Merit area, including *Erigeron speciosus* 'Quakeress,' *Helenium* 'Moerheim Beauty,' and the purple spikes of *Salviax superba* (*virgata nemorosa*).

Fuchsia species are noteworthy in the large Temperate house, such as *F. serratifolia* and *F. corymbiflora*, besides the specimen of *Datura Knightii* with double trumpet-shaped flowers, the climbing sky-blue *Ipomaea Learii*, and *Solanum Wendlandii* trained to a support of the house and producing trusses of very large mauve Potato-like flowers.

In the Half-hardy house the glowing orange flowers of *Mutisia decurrens* will be conspicuous just inside the door, but in addition there are also the yellow *Asteriscus maritimus*, crimson *Pelargonium Schottii*, the climbing white *Solanum jasminoides* var. *album*, and *Selago serrata*, a low bush which bears bluish flowers with a yellow disc.

MASTERS MEMORIAL LECTURES, 1939.

HOW PLANTS HAVE FOUND THEIR HOMES.—II.

By J. C. WILLIS, M.A., Sc.D., F.R.S.

[Read April 19, 1939, Prof. F. E. WEISS, D.Sc., LL.D., F.L.S., F.R.S., in the Chair.]

WE have now seen, in outline, some of the difficulties that have gradually appeared in the path of the theory of gradual adaptation, operated by the process of natural selection. The first difficulties that were generally appreciated were the facts that the small fluctuating variations upon which DARWIN chiefly relied were neither irreversible nor differentiating. If a cross were made between two individuals that both showed a high degree of some character, the offspring did not retain that degree, but mostly fell back from it, and if left alone the improvement soon disappeared, especially if crossing with others could go on. And though these variations showed quantitatively in all characters, they were not differentiating. A leaf might be longer or thicker, but it did not vary in such a direction as from opposite to alternate, from simple to pinnate, from pinnate to palmate, in fact in any of the directions which give new morphological characters of importance.

These two difficulties were gradually surmounted by the coming in of the theory of mutation, published by DE VRIES in the earliest days of this century. According to this theory, changes that were differentiating and often hereditary might happen at one stroke. When one sees a large change of this kind, as one so frequently does in a garden, one usually calls it a sport. The late Dr. MASTERS was much interested in the sports that have been found in the vegetable kingdom, and wrote a treatise upon those that had been seen, which he called Vegetable Teratology. For example, a well-known sport at times appears in the toadflax. Its normal flower is what we call dorsiventral, standing horizontally with an upper and lower side, as one may also see in the salvia, and there is one spur upon the lower side. The sport has a regular and erect flower, with five spurs. In this case, and in most such cases, the mutation, or sudden change, is not hereditary, though it is frequent enough. But in another case, where it is not frequent, there seems some reason to suppose that at some far back period a similar mutation gave rise to a new genus. The larkspur has a dorsiventral flower, with one spur, whilst its close relative, the columbine, has a regular flower with five spurs. There must have been sudden mutation to change the number from one to five, or five to one.

This case of the columbine looks as if it must have been something of the nature of a mutation that was really hereditary and irreversible, but we cannot prove it, and as the vast majority, if not all, of the mutations that are seen to appear are not fully hereditary, people are still shy of admitting that mutation can take much part in evolution, though at last various methods by which mutations may be produced are being discovered.

When the idea of mutation first came into use, people were, and in fact still are, anxious simply to substitute it for the former fluctuating variation so that evolution could go on by the gradual adaptation of a plant by the natural selection of small mutations instead of small fluctuating variations. It would be almost absurd to talk about adaptation if in one stroke, by a large mutation, a plant could change from one species to another allied one of the same genus, or even to another genus, as in the case of the larkspur and the columbine. One great difficulty about this position is that of going on from the first small mutation which is required to give the evolution a new direction—a thing that was almost impossible with fluctuating variation. Why should a small mutation, say in the direction of a pinnate leaf from a simple one, be followed by another in the same direction ? One was still without the shadow of a proof that the pinnate leaf was of any special advantage against a palmate or a simple one, still more of any evidence that a small mutation could be followed, or was likely to be followed, by others in the same direction. If we once reconsider the idea that all structural features must be in some way the expression of adaptations that have gone on, and discard the illogical conclusion that is usually drawn from that, that the structural characters must themselves be part of, and useful in, the adaptations, we shall have a better chance of understanding things. Both the structural and the functional changes are evidences of evolution, but how they are connected we have as yet no clue.

If we discard this idea, there remains no particular reason why the whole change from one species to another, or probably from one group to another, should not be effected at one step. There is no longer any reason for gradual passage, and indeed it is very difficult to conceive such a thing between, for example, the monocotyledons and the dicotyledons. One can think of no adaptational reason why all the characters that distinguish either of them should go together, for example, one cotyledon with a trimerous flower, with parallel-veined leaves and with a peculiar anatomy. These characters seem to have no conceivable relation with one another, and one cannot think of any kind of life that one can call monocotyledonous, but with a knowledge of the strange combinations that go together in one mutation in the case of sports, they do not seem so extraordinary if one regard them as having gone together in some ancient mutation of some single ancestor.

We may now return again to the facts of geographical distribution. At the first exploration of new countries the species discovered would tend to be the more common and widespread ones. But as time went on more and more species were discovered whose areas of distribution proved to be comparatively small, many of them restricted not only to one country, but to small or even very small areas within that country. Thus in Ceylon, which is smaller than Ireland, there were gradually discovered some 750 species confined to the island. Of these over 100 were confined each to one mountain top or to a small group of mountains. Darwinism was coming in, and these very localized species, to which we usually give the name of *endemic* species, were just what was needed to fill a place in its requirements. If a species gradually appeared with improved adaptation, it was clear that the older one from which it sprang would not be instantly killed out, but would linger on, becoming less and less common until perhaps it finally disappeared. In fact it had become a relic and was to be regarded as dying out. One could not look upon species which covered large areas as defeated and dying, so that the harmless local endemics just filled the vacant place. Other people took the view that local species were adapted specially to local conditions, and most people still believe in one or the other of these two opinions. On the one hand, the local plant is a failure and a relic, on the other, it is a success, which shows that we really know little or nothing about it.

People still waver in their adherence to one or the other of these explanations, which are mutually contradictory. The view of local adaptation is now losing ground, and the selectionists are concentrating their forces on the relics.

But neither of these explanations can in any way account for the arithmetical basis which shows in distribution and gives rise to what I have called the hollow curves. The areas that are occupied by species may be of any size from a couple of square yards upwards, and there is nowhere that one can draw a line between small and large. But in any single genus or group of genera the species occupying large areas are few ; more occupy medium areas, and yet more again, small.

We are now in the region of statistics, which are very often misunderstood. If one weigh 10,000 country Scotsmen picked at random and 10,000 country Englishmen, one finds that the average weight of the Scot is greater. Upon this one bases the statement that the Scot is heavier than the Englishman. But one is apt to be met with the reply : "That's ridiculous ; Smith's much heavier than Macdonald," and one's interlocutor seems to think that that settles the matter.

The statement which we have just made about areas occupied by species was based upon statistics, and is only true when one keeps to numbers and compares those numbers with numbers of others that are related to the first.

If one divide the species of a genus or family into those of large, small, and medium areas, one finds that if one add together the numbers in the large and the small, they make more than twice as many as those in the medium, or in other words they make a hollow curve, as one will see in a moment if one draw a line joining the tops of vertical lines whose lengths are, for example, 10, 4 and 1, placed at equal distances apart.

Now, not only does this hollow curve show with the distribution of species by areas, but it also shows with the distribution of genera in a family by the number of species that they contain. We must always remember to keep to related forms, which as a general rule will behave in much the same way. Take, for example, the family Monimiaceae, of 32 genera and 337 species. The two largest genera, Siparuna with 107, and Mollinedia with 75 species, range from Mexico to Rio de Janeiro or south of it, the smaller genera over less districts. Siparuna has one species that covers the whole South American area of the genus, some of the intermediate areas, and a great many very small areas, thus making a marked hollow curve for areas. Mollinedia, on the other hand, though its total area is much the same, has only one species that even ranges as far as from Rio de Janeiro to Monte Video ; most of its species are quite local, and over 95 per cent. are so local as to count as relics under the natural selection conceptions. What is selection doing in these two cases ? And still more, what is it doing or going to do with the rest of the family, where the genera contain 30, 25, 15, 15, 11, 7, 6, 5, 4, 4, 4, 3, 3, 3, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 species respectively, and all but the very small ones show hollow curves of area ? One cannot draw a line in a curve like this to separate the sheep from the goats. Relics would not be made in steadily diminishing numbers, nor would local adaptation be neatly graduated like this. All families of reasonable size show the same curve. Close together though they are, the curves never touch, and when turned into logarithmic curves, they all give approximations to straight lines, *i.e.* they have the same mathematical form, and must be the expression of some definite law which is behind evolution and distribution, and which does not agree with current views about these subjects. Many distributional subjects show the same form of curve among families of plants and animals, endemics, floras, and fossils.

This similarity interested me very much, and I have lately completed a study of the distribution in Canton Vaud, where I live, of the surnames of farmers, a class who move about less than others. Vaud is about the size of Gloucestershire, but divided into valleys often separated by very high mountains, which make intercourse between the valleys difficult. After a day on the farm, a young man is not going to cross a high mountain range to see his best girl, but marries in his own valley. The result has been a very interesting distribution of surnames.

In a great proportion of the villages in the canton, some hundreds in number, there are local names found only in one village each, that is, endemic, sometimes on only one farm, sometimes on two or more, and sometimes in two or more villages, but in smaller numbers as one goes upwards, as with the plants. Most often the villages are close together, but at times they are as far off as a man can walk in one or two days, their distances and the tracks on which they lie showing the directions of emigration of young fellows in search of work.

The name "Rochat," for example, is very common in the valley of Joux, and has spread furthest into the country around, whilst the names that are less common have spread less. It is impossible to maintain that the possession of the name "Rochat" gives any advantage in the struggle for existence as against the name "Capt," which is less common in Joux and has not spread so far beyond it. Natural selection can have nothing to do with the distribution of surnames, and yet they behave exactly like species of plants. The distribution of species of plants that occurs in Ceylon, for example, outside the island, goes with their distribution inside the island, just as we have seen in the case of the surnames. But natural selection could not adapt a plant that was to come, say, from West Africa, to suit Ceylon better than a plant that had only come, say, from Bombay. If anything, one would expect the latter to suit Ceylon the better.

All these various curves match, and so do many others, like the curve of hotels in a town in Bradshaw, and they must be determined by the same rules; we can hardly imagine selection forming them. Adaptation can only be to the conditions surrounding a plant, and it is absurd to suppose that the bulrush or the silverweed that occurs in New Zealand as well as in Europe could become adapted in Europe, let us say, to the conditions in New Zealand. That it suits them is due to luck and to gradual adaptation as it travelled.

This will suffice to show how the theory of natural selection in its turn is meeting with great obstacles, which made my friend, Dr. GUPPY, who had devoted his life to the study of distribution, adopt in 1906 the theory of differentiation, and myself in 1907. The theory is pre-Darwinian, and supposes that as the world became drier, and its climates became more different, the plants became differentiated into more and more species to match them, the whole specific difference appearing at one step.

We have seen some of the difficulties with which natural selection is meeting, and as I hope to show in a book which is now nearly complete, there are many others also. The hollow curves are the insuperable difficulty, and to reconcile them with the theory of differentiation I add the supposition that the evolution that goes on, shown in the structural characters, has nothing to do, *directly*, with adaptation, and certainly not with direct adaptation. The characters do not necessarily indicate adaptation at all. Every now and then a character appears like, for example, climbing habit, of which natural selection can make use, and which is therefore retained, but natural selection was not the direct cause of its appearance, nor was its appearance, in all probability, as accidental as that theory would involve. It appeared full fledged, and was advantageous, or, at any rate, not harmful. And if it had no necessary adaptational value behind it, there was no particular reason why a plant carrying it should spread at a different speed from other species of the same or closely allied genera, a supposition which at once made the hollow curves a normal feature of distribution. And there was also no reason why the many new species that have appeared should not appear at a rate that was, at any rate, not determined by the necessities of adaptation, as we have seen in the case of the Podostemaceae. A species that reached a sand dune, for example, if it were reasonably suited to it upon arrival, would gradually adapt itself in more detail to some definite local conditions there, by physiological adaptation controlled by natural selection.

What the mechanism was by which this evolution was carried on we do not know. I suggested in 1907 that " a group of allied species represents so many more or less stable positions of equilibrium in cell division." All the work that has been done upon chromosomes since that time has gone to show that there is nothing impossible in supposing occasional changes happening in the nucleus that might suddenly bring about such a change of equilibrium as would make a new species spring from an old one. What I have already said is enough to show that it is unlikely that this would happen by gradual change, and there is also no evidence, from the fossils that have been found, to show that gradual change was even frequent. Still less can we imagine this gradual change being guided by the mechanism of natural selection, as DARWIN postulated. The case of the Podostemaceae, with their extraordinary variety of morphological character and their extremely constant conditions of life, is another very strong argument, as is the fact that we can find generic and specific distinctions among the parasitic fungi, which live in such very uniform conditions that one can hardly expect adaptational differences among them. One would not expect morphological differences to be called forth by the chemical differences that are the chief distinctions between the habitat of one species and that of another. We are continually being assured by the morphologists that morphology has nothing to do with physiology, though, of course, structural characters perform physiological functions, and I think that for the present, at any rate, the best thing to do is to take them at their word. We ought not to assume, as we have all along assumed, that though the structural characters show us that a vast amount of evolution must have gone on to produce 180,000 different flowering plants, they also show that there are 180,000 adaptational niches, each one so different from the rest that it required a species specially to fill it. The mere fact that the areas covered by species fit into a hollow curve seems to me enough to disprove this. Adaptation could not be graduated so as to form a hollow curve. Why should Ceylon need 750 local species as well as 2,000 that occur outside the island also, while in the cooler part of the north temperate zone there are hardly any locals at all ? Something else than direct adaptation must have produced the structural differences characterizing the species, and it has not marched in even step with the adaptation that has gone on.

On the theory of differentiation a mutation may at one stroke give rise to a new variety, a new species, a new genus, or even a new family.

It is not specially difficult to conceive of one that might cause the two great groups of the Monocotyledons and the Dicotyledons to separate, and this separation is certainly much easier, to say nothing of more probable, than to imagine natural selection doing it upon adaptational grounds. No one can conceive any " monocotyledonous " type of life to which one cotyledon, a trimerous flower, a parallel-veined leaf, and a peculiar anatomy, could be suitable. But upon the theory of differentiation there is no need for the new form to be superior to the old in adaptational qualities, so that the two forms may go on living near together without the old one being necessarily at a disadvantage and slowly dying out. It will at once be seen that in this way the increase in number of forms, which has undoubtedly been going on for ages, is easily accounted for, since every now and then one form becomes two, and both survive, and the hollow curves of sizes are normal features. Selection by its very name implies a decrease in number ; only when a species gives rise to two or more can there be any increase. I have spoken of the Monimiaceae, and if one is to look upon all the small genera, as natural selection would have us do, and also all the species of small distribution, as relics in process of dying out, it is clear that when their extinction is finished, the family will be at most only half as large as it is now. At least half the whole flora of the world may be looked upon as relics from the point of view taken by the supporters of natural selection, and the regular graduation of species in area occupied, and in number in the genus, from large down to small, in a hollow curve, shows that there is nowhere that one can draw the line, and say that those on one side are relics, those on the other successes. Natural selection is a very doubtful agent for securing increase in size in a family.

The theory of natural selection makes evolution go in a direction from the species towards the family. By the theory of differentiation the progress is in the opposite direction, from the family towards the species. A mutation forms the first member of a family by a divergence from its parent that is larger than usual. The family therefore will begin as one genus with one species ; all three, family, genus, species, are the same plant. From this one, by further mutations, will descend the rest of the family, however large it may become.

Following the history of the original ancestor of a family, its mutations will probably vary in " size." It may go on indefinitely with small mutations, causing such small differences among the new forms that they will all count as species of one genus, as in the family Symplocaceae, which has only the genus Symplocos with 300 species. Or, and more often, some of its mutations may be of generic rank, and it will, though itself surviving, and probably having the largest, or nearly the largest, number of species in the family, give rise to other genera, which will be smaller and smaller in number of species the later that they are formed, till the family ends with the tail of genera of one species that we have already seen to be a characteristic feature of all families.

This is the essence of the theory, that as it does not call for continually improved adaptation *all* genera formed *may* survive, and that the evolution goes in the direction from the family towards the species by continual mutation, which probably in the vast majority of cases simply gives two where before there was but one, thus automatically accounting for the increase of the family and for the fact that the genera become more numerous the smaller they are. The table shows a few examples of families arranged by the number of species in their genera.

Amarantaceae 170, 100, 90, 70, 60, 50, 30, 30, 20, 15, 14, 11, 10, 8, 8, 8, 7, 6, 5, 5, 5, 5, 4, 4, 4, 3, 3, 3, 3, 3, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1.
Aristolochiaceae 300, 60, 10, 8, 1, 1, 1.
Balanophoraceae 70, 4, 4, 4, 3, 3, 3, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1.
Basellaceae 14, 3, 1, 1, 1.
Monimiaceae 107, 75, 30, 25, 15, 15, 11, 7, 6, 5, 4, 4, 4, 3, 3, 3, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1.
Orchidaceae 750, 550, 450, 425, 400, 350, 325, 200, 175, 150, 120, 120, 120, 120, 120, 120, 115, 110, 100, 100, 100, 100, 90, 90, 4/80, 3/75, 3/60, 8/50, 3/45, 9/40, 6/35, 11/30, 25/25, 16/20, 5/18, 4/16, 22/15, 25/12, 30/10, 23/8, 13/7, 24/6, 41/5, 41/4, 49/3, 106/2, 231/1.

When one looks at a table like this without any preconceived ideas, it seems impossible to maintain that these genera and species have been formed by a progressive structural adaptation, and that all the great crowd at the bottom should be dying out at a rate that is steadily becoming slower. There are 231 orchids at what one may call the point of death, but only 106 to follow them, then only 49 to follow those, and so on. Where is one to draw the line between the successes and the failures ? All families of plants and all the animals that have been tested give the same curve.

At present all that can be done is to show that the direction of evolution was as differentiation, rather than natural selection, would have it. The two directions are diametrically opposite, and I have been able to devise about 20 crucial test cases, all of which show that evolution probably went in the direction in which differentiation would have it go.

These proposed changes from the current views of evolution by natural selection have very important bearings upon the question of the distribution of plants about the world, which we have seen to be in many ways inexplicable upon former conceptions. If we admit that the appearance of some new morphological character, such as opposite leaves in place of alternate, or a flower with parts in threes instead of fives, does not necessarily imply anything adaptational, we get a conception that hangs together. If adaptation be removed as a thing necessarily always visible in the morphological changes that are going on, there is little reason why the new form should always kill out the old, and we may consider that all forms will probably on the whole survive, and that there ceases to be any reason why one form should spread about the world at any seriously different speed from one that is closely similar to it. The rate of spread of a coniferous tree may be quite different from that of a buttercup, but there is no particular reason why the bulbous buttercup should travel faster or slower than the creeping buttercup. Both are well enough suited to the ordinary meadow type of life, and will spread with it, but may be in completely wrong conditions if they try to go outside it.

We are still as far as ever from understanding why the morphological changes should go on, but there are probably driving forces behind them, as we have seen in the case of the Podostemaceae. Most probably they are due to some kind of change in the make-up of the nucleus in its genes and chromosomes. A comparison of the Podostemaceae, with 160 species growing in uniform conditions, but with an active force all the time at work, and the Hippuridaceae with only one species of world-wide distribution, is instructive; the latter, though in very uniform conditions, has no outside deflecting force at work. Many of the countries which are prone to great drought have large numbers of species and there may be some connexion there. But the question does not affect the present lectures.

I am afraid you may think that I have carefully avoided the subject of these lectures, and have said little or nothing about how plants have found their homes. What I have been trying to do is to show the different conceptions that at various periods have tried to explain how they came to be where they are. After all, our knowledge goes but little beyond the actual facts as yet. We know that the palms come no further north in nature than the south of France; at first it was said that they had been specially created for warm climates, but why should the line be drawn just there? And why should other tropical families end further south? We in north-central Europe call all climates to the south warm and our own the best, those to the north cold; but a Lapp whom I met in the Lapp museum in Helsingfors (at the level of the north of Scotland) said: " Thank heaven I am retiring in November and can get out of this heat." On enquiry, it turned out that he was going to the Arctic Circle. After the coming of natural selection it was said that the palms stopped where they did because they were not adapted to the greater cold further north. But again, why did the palms come furthest north of the really tropical families? But both the actual Chamaerops of the south of France, and a number of other species, are quite happy at Montreux, so long as one does not try to grow them in the midst of native things. But this simply means, to my mind, that we have tried to acclimatize them in too much of a hurry. Had Nature been left to herself they might have reached the north of France in another hundred thousand or half a million years. Acclimatization, as I have pointed out, is in nature an extremely slow process, and man with his insignificant length of life, is anxious to see results within that short span. If they do not happen as quickly as that, he is tempted to suppose that they will never happen.

If one look at the subject without preconceptions, one will realize that most of our "explanations" of geographical distribution simply consist in stating the facts in another way. When we say that *Lactoris fernandeziana* (which is now usually regarded as of family rank) is characteristic of the Juan Fernandez floral region, it *sounds* as if we knew more about it than if we simply stated the bald truth, that it occurs upon the islands of Juan Fernandez only. If there were an isthmus to Chile, it might quite well, as its family separation shows that it must be very old, have reached even as far as that country, and would cease to be "characteristic" of the region where alone it is at present found.

By ascribing resemblances to evolution from common parents, natural selection made a great step in advance, which for a long time satisfied the students of distribution. It was based entirely upon adaptation, which became a kind of fetish. No species could come into existence unless it was an adaptational improvement upon its predecessor, which became in time a relic in process of dying out. This puts adaptation into a position which it is hardly too much to say that it does not deserve. It put before botanical workers the somewhat troublesome task of finding 180,000 adaptational niches (of every possible size) to suit that number of species, and of finding out in each case why the existing species was suited to its place. The only things that distinguished the members of this great multitude of species from one another were what we call their morphological characters, the form, size, and arrangement of their constituent parts. The still more formidable task was thus set of finding out in what way these characters showed adaptation. Under this theory, each species owed its place to adaptation, and as there were only the morphological characters to show that it was a species differing from others, it was taken for granted that it must be in them that the adaptational characters were shown. No one thought of physiological or internal functional adaptation; it was all supposed to be structural. After all, all that a plant requires in order to get along comfortably in any place is to be suited to all the conditions with which it may there meet, such as the kind of soil, the range of the climate, the range of competitors, and so on. To these it can quite well become suited by mere physiological adaptation, as is shown by the enormous ranges through considerable variety of conditions occupied by many species, as, for instance, the *Hydrocotyle asiatica* quoted above, which shows no important morphological differences throughout its great range. No single plant of a species like this can be said to be adapted to the whole range, though the *species* can. Why should the same bulrush be suited to both England and New Zealand, when England needs 15 different buttercups, and New Zealand 36? We have no reason whatever to suppose, that given time enough, any species could not adapt itself to a considerably greater range than it now occupies, unless it is surrounded by really impassable barriers. *Cupressus macrocarpa* is only known wild in part of California, yet has proved a godsend to a great part of the warm temperate parts of the world. Sarracenia, the North American pitcher plant, is not common in its native country, and is often looked upon as a relic, yet it has become acclimatized in a bog near Montreux, after some years, and is now quite at home. *Time* is the essential thing in acclimatization, and nature does not need to stint it.

After the breakdown to which the study of adaptation, as expected to be shown by morphological characters, had led, there rose the modern science of ecology, which makes a special study of the composition and the life of all the many associations of plants that characterize a country like England, and which, as I have said, were probably the first botanical phenomena to be noticed, such as woods, moors, fens, dunes, and so on, associations which show few plants in common between any two, differing considerably in soil conditions, in local climates, in vegetation, and in other things. An interesting point in the present connexion that has come out of this work is that the distribution of a plant goes, as a general rule, with that of the association to which it belongs—in other words, that the plant goes to, and succeeds in living at, places where it will find approximately the same conditions as before. This also means that distribution will be extremely slow, as a plant will probably not be able successfully to get into another association unless the change of conditions is so slight or gradual that it can become easily acclimatized. One can find no morphological characters in the plants of an association which show any trace of similarity that one can put down as adaptation to life in the conditions of the association, unless in a few extreme cases like the plants of a sand dune, where one may find one or two showing a certain amount of water storage.

Ecology, however, does not concern itself with the composition of the whole flora of the whole country. It does not matter to a British student of ecology that the palm Chamaerops does not occur further north than the south of France. What he is concerned with are the many associations or societies of plants that occur in Britain itself, such as moors, fens, woods, etc., with all their many subdivisions, and the passages of one into another, and the actual native plants that occur in them. Some plants, and they on the whole the most common in Britain, occur in more than one association; others in one only.

On the average, the distribution of a plant in a country goes largely with its distribution *outside* that country. The commonest plants in Ceylon, on the average, are those that reach the furthest into the outside world. It is clear that natural selection, say in India or in West Africa or wherever the plant came from, could not adapt a plant to suit the conditions of Ceylon. This, therefore, was a fact which did not fit in with natural selection any more than the hollow curves, and I attempted to find an explanation by means of my theory of Age and Area. Upon this supposition, the area occupied by a species goes approximately with its age *in its circle of relationship*, taking a dozen species to get a good average, and comparing only with a similar average from close relatives, which may be expected to behave in the same way.

This supposition fitted in well with a great many of the known facts of distribution which had proved great stumbling blocks to an acceptance of the older views. In particular it went well with the hollow curves. But it met with great opposition, since people almost at once realized that it did not run in double harness with natural selection. It agrees well with the theory that I have put forward in these lectures, that in general the morphological distinctions of species have little or nothing to do with their adaptation, which is primarily physiological. A leaf, for example, may be regarded as an adaptation, if one like, though one cannot imagine it as developed by aid of natural selection from something different ; but there can be no adaptational difference between an alternate and an opposite leaf, or between a palmate and a pinnate, so far as one can imagine. Yet both these distinctions are quite frequent between one species and a closely allied species of the same genus, so that it is evidently quite a simple matter to produce such a difference. One can easily imagine chromosomic mutation doing it, but nothing else as yet known to us.

Under natural selection, distribution depends primarily upon adaptation, and the things that are confined to small areas are regarded as relics, or sometimes as local adaptations, though these interpretations are completely at variance, a fact which shows how great ignorance upon the subject really is. But, as I have indicated, neither of these interpretations can be harmonized with the universal occurrence of the hollow curve. The few cases of relics or of local adaptations which undoubtedly occur are too few in number to affect the curve ; they are lost in the crowd. If we look upon adaptation as no longer responsible for distribution, we may consider it highly probable that, as just suggested, distribution will proceed at more or less the same speed for things that are in the same circle of relationship. Quickly reproducing herbaceous plants, for example, may spread more rapidly than slowly reproducing trees. In such a quality as tree or herb nature, or in the peculiar characters that mark xerophytes like Cacti or many other things, one may recognize a kind of adaptation, but not in the endless morphological differences that separate the innumerable species that occur in the world. Probably quite a small proportion of the existing species would be enough to fill all the adaptational niches that there are, for there can be no doubt, from the spread of so very many species into such a variety of conditions for each, that physiological adaptation, which so far as we know need not, and probably usually does not, show in morphological characters, is very common, and quite possibly all but universal.

To explain why plants occupy the positions that they do, we thus have three explanations. The two offered by the supporters of natural selection are mutually contradictory. One says that the very local plants are relics, the other says that they are local adaptations. There is little evidence in favour of either, whilst there are many things, and especially the hollow curves, against them. Neither can explain these curves, which show everywhere. The third explanation, which I have put forward above, and which was partly published sixteen years ago, fits with the curves, and with the general facts of distribution as we know them at present. The area occupied by a plant seems to depend largely upon its mere age. If in 1,000 years a plant spread to occupy 100 square yards, in 2,000 it may occupy 200, and the speed will increase as time goes on, for simple arithmetical reasons. If we do not look upon distribution as due to adaptation in every individual specific case, there is no reason why a group of allied species should not occupy much the same area as another group of equal number and equal age. If species are not closely allied, they may belong to quite different adaptational groups. No one will expect a dozen plants belonging to the adaptational group of trees to spread at just the same speed as a dozen belonging to the group of herbs or water plants, nor mesophytes to spread at the same rate as xerophytes, and so on. The thing is to recognize that species are more numerous than the adaptational classes to which they belong, and that the *structural* distinctions between them have no necessary adaptational value. Many things that are commonly called adaptations, such as climbing habit, are probably characters that appeared at one stroke, and not being harmful, were allowed to survive, or at times may have been useful.

Possibly outside causes, as in the Podostemaceae, or in the action of cosmic rays, and probably more often internal causes, are the reason why evolution has gone on to such a large extent, and has produced so large a number of species, so much larger than would seem to be adaptationally necessary. So long as a plant is mesophytic there is probably little or nothing to choose between one and its near relatives—one is better suited, for example, to life in the shade, one to life in the sun, but there is ample room for both; which is adopted will depend upon that to which the parent was accustomed. But in a whole adaptational class like the xerophytes, the morphological changes which one can associate with xerophytic life are but small.

In early days the world had a climate which was probably damper and more uniform than what now exists. Gradually, with the drying up that went on, it would begin to show greater heat towards the equator, cold towards the poles, wetter towards the sea and the prevailing winds, drier inland, and so on. Upon the theory of differentiation, the plants began to differentiate to match the climates, but the change in the plants would be *functional*, and would not necessarily show in morphological characters. Each plant in turn, as it was produced in the *structural* evolution, would probably inherit the local adaptation of its ancestors, and as it gradually adapted itself to slightly different physical and other conditions of life, would begin to spread from its first locality. All this time the morphological evolution would be going on, each new species being formed at one step. When anything in the nature of an improvement was formed, it would at once be seized upon in natural selection, like climbing habit for example, and so perpetuated. But the great bulk of the changes, especially in mesophytes, would not be of any necessary adaptational value at all.

Why all the new species, which are in general, upon the theory of Age and Area, the youngest ones, the ones that have not yet had the time to spread far, should ever have appeared at all, is another question, to which at present we can give no answer. It is probably due primarily to some kind of mutation, and this in turn due to some rearrangement of chromosomes, or parts of them, in the nucleus of the cell. But what again caused these we do not know. It is, for instance, possible that small changes due to physiological adaptation, or to external forces as in Podostemaceae, may gradually become added up till there becomes such a strain or disequilibrium in the nucleus that some sort of kaleidoscopic change occurs, and results in a new position of equilibrium, which produces a new species. It is, for example, fairly certain that mere long isolation results in new species, as I tried to show thirty years ago. But all this is a matter for future work.

The fact that a certain plant finds its home only in one little spot, with one set of conditions only, such as some of the endemics of forests occupy, we may probably put down to the fact that it has only recently sprung from a parent living in conditions that were the same or only slightly different. It has not yet had the time to appear in other places at any distance from the first, in which the conditions might be slightly different, so that a slight physiological adjustment might be called for. Dispersal must be very slow, and when a plant is in the condition of a few individuals only, its chance of getting a seed upon any open space must be small. In the case of trees, especially, it will be very small, and it may be an immense time before it happens. It may not even happen at all, and the species may ultimately die out again. But with each new individual that becomes established and reproductive, the chance of further spread is increased.

As the species grows and spreads, it will, by slow movement and gradual acclimatization become suited to conditions that differ slightly from those in which it began, and as its numbers increase it will have a continually better chance of spreading further. But sooner or later, it will come up against some impassable barrier, like the sea, a chain of high mountains, a sudden change of climate, and so on, and while species that were very old would probably find more uniform climates with fewer barriers, those that were very young might soon come up against them.

It is all the time becoming clearer that behind all the evolution that is going on in the world, there seems to be some kind of general law which we may call, if we please, mathematical. As Sir JAMES JEANS has said : " All the pictures which Science now draws of nature, and which alone seem capable of according with observational fact are mathematical pictures."

It begins to look as if the evolution which is going on all the time is following some definite law, which determines that under such and such conditions chromosomes shall behave in such and such

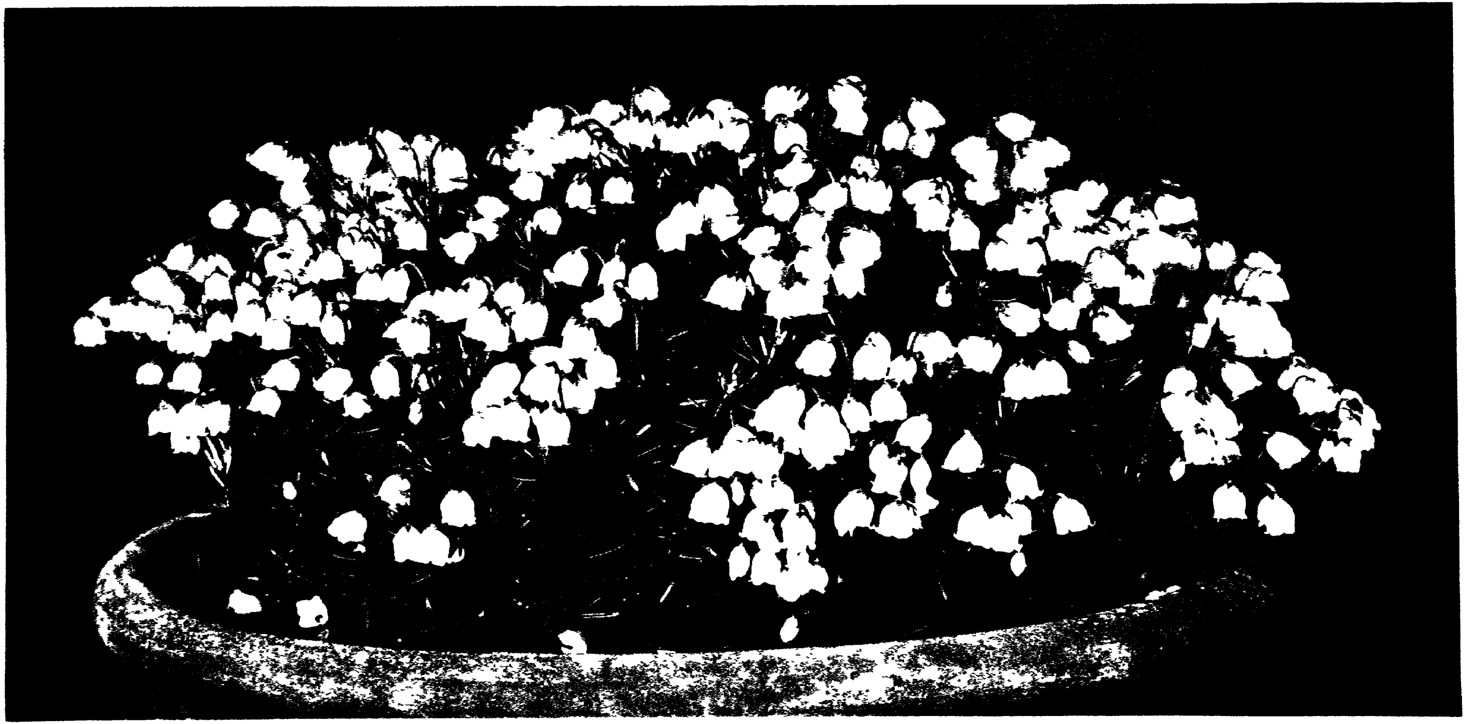

FIG. 69 PHYLLODOCE NIPPONICA

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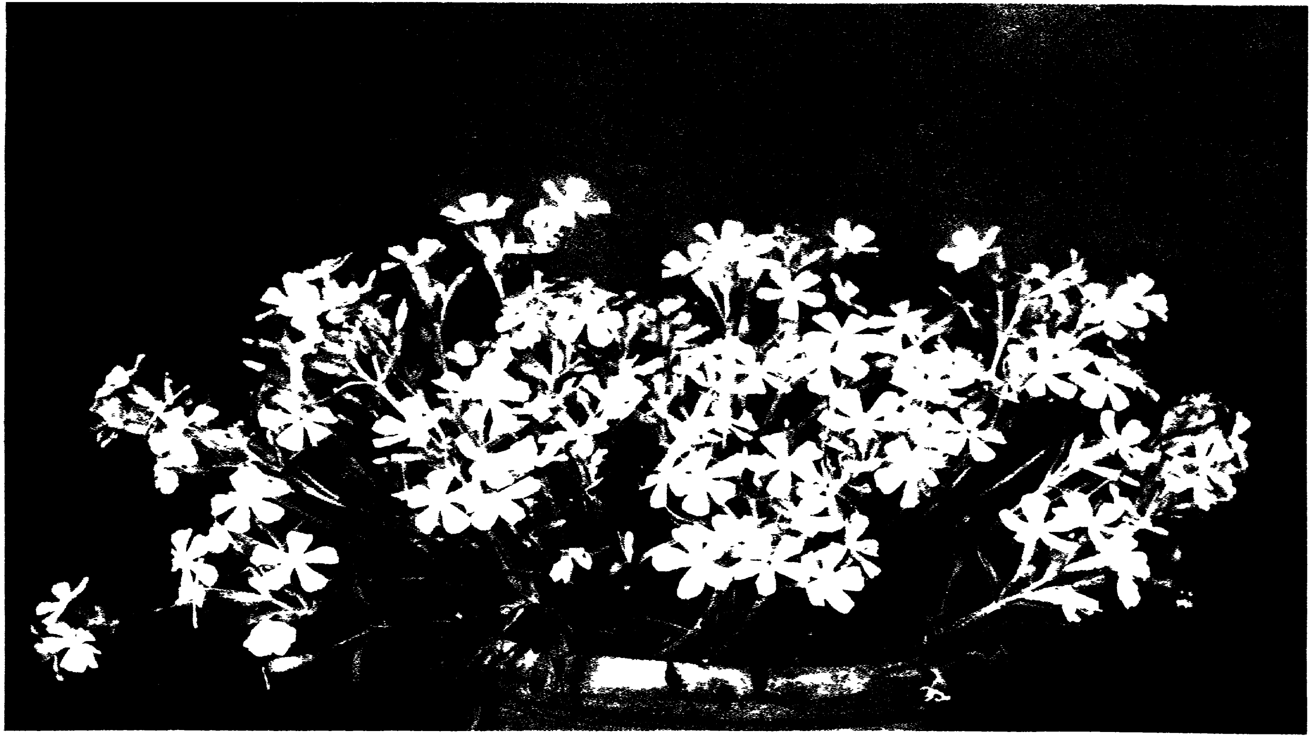

FIG. 71.—SILENE WHERRYI

A.M. 1939

a way. We know that their behaviour in reproduction follows certain mathematical laws, and there is therefore every reason to expect that in evolution they will do the same. Evolution seems to produce a larger number of species than are actually needed to fill the various conditions of life, and where these species are at present to be found depends largely upon their mere age, whilst they are sorted into the more suitable places by the action of natural selection, which kills out the unsuitable ones. And given time, and no complete surrounding by insurmountable barriers, a species may extend its area, spreading with great slowness and becoming slowly suited to slightly different conditions by internal and functional adaptation which, given time enough, may at last cause it to grow in such completely different surroundings as we have seen occupied by *Hydrocotyle asiatica*.

THE HORTICULTURAL COLOUR CHART. VOL. I.

By MARGUERITE E. BUNYARD.

THE decision of the Royal Horticultural Society, in collaboration with the British Colour Council, to produce a Colour Chart as a means to the much desired standardization of colour description in Horticulture has resulted in the publication of the first volume of the Horticultural Colour Chart.

In comparison with existing charts this is a notable advance in every way, but more particularly in the nomenclature, grading of the colours, and the fine colour printing. The whole is the result of three years' intensive work and experiment in the reproduction of natural colours.

As emphasized in the Introduction the colour names used are " in accordance with the standards accepted by makers and users of colour in the British Empire and in many foreign countries. There will thus be but one colour-name recognized for each hue in the textile and all colour-using industries as well as by artists' colourmen. While, therefore, the colours chosen and names used have been selected primarily for the purposes of horticulture, the Royal Horticultural Society Colour Chart will also have a use and value far outside its horticultural scope."

The names of the colours are for the most part simple and in common use, many being of those of flowers of traditional colour, such as " Marigold," " Nasturtium," " Buttercup," etc., and the few more unusual names should soon become familiar with use, as do those of new plants.

The historical authority given for the choice of each name justifies its usage and inclusion in the chart. The list of foreign synonyms makes the chart of international use, and this is of great value to horticulturists where interchange or the introduction of new plants is concerned, insuring the possibility of correct description of flower and leaf colour. That this is essential will be recognized by all. From the point of view of the botanist also, the foreign synonyms will be of obvious value.

The horticultural examples given for each sheet of colours are, it will be noticed, mainly those of species, rather than varieties, as being more permanent. Where possible, well-known examples are given, but it must be remembered that the chart is not a dictionary of flower colours, but a guide for matching and description.

The Introduction gives concise instructions for the use of the chart, and it is of the utmost importance that these be followed in order to secure uniformity of conditions for matching so far as is possible. Colour is subject to so much variation and depends so much upon the immediate environment and light conditions that only by matching the flower colours as suggested in the chart will accuracy be approached.

The three stages of flowering suggested—bud, fully out, and full to fading—are very often quite distinct in colour and, in most cases, differ considerably in tone, so that the average description should be of the flower as near perfection as possible—a single bloom of a large flower, such as a Rose or Tulip, and a head, as in the Sweet William, Thorn, or Geranium. In flowers such as Delphiniums the colours change according to their age along the stem from bud to fading, so that fully opened and perfect blooms should be chosen somewhere about the middle of the spike. The same applies to Lupins.

Flowers of several hues are, of course, the most difficult to match, particularly Roses, but there the " General Representation " obtained by an arm's length view gives a sufficiently accurate match for most purposes. The isolation of the matching colour by the black mask provided with the chart is an important point which will be best appreciated by experimenting without it and comparing results.

If there is a great deal of matching to be done at one time, five minutes rest for the eyes when tired is usually sufficient to restore them.

If the instructions are carefully followed it will be understood that the description given refers to the general representation of one flower *per se*, or isolated petals in the cases of bicolors or polychromes, and reference to the effect of such flowers in the mass or in bright sunlight, etc., can be indicated as required. As an example of this, the flowers of the common pink Thorn, Ribes and *Malus floribunda* all look a very much deeper and brighter pink in the mass upon the tree in the sunlight than in individual heads of flowers matched against the chart.

The rather difficult and technical question of the use of colour terms is adequately and clearly explained in the Introduction, and of those which are in frequent use in catalogues the terms " hue," " tint," " shade " and " tone " should be studied and differentiated. The note on " shade " explains the common use of the word, and as it is so generally used to mean " colour " it would be, as the note suggests, hopeless to try to effect a general change. Horticulturists, however, would do well to confine the use of the word " shade " to indicate its true meaning, *i.e.* a darker tone of any colour. The uses of the special terms in colour—selfs, bicolors, chromatic selfs, etc.—assist brevity in description.

The first sixty-four sheets of the chart run in beautifully graded sequence through the colours yellow–orange–red–crimson–purple–violet–blue–green to yellow again. It will be noticed that the yellow of Sheet 2, " Canary," is a definitely warm yellow, toning towards the orange side, whilst that of No. 1 has a distinctly greenish tone, completing the circle.

Noticeable distinction can be observed between the red-violets, as on Sheets Nos. 30, 31 and 32, and the blue-violets from Nos. 33 to 39. In each the influence of the nearer colour in the spectrum on the left side fades away and is gradually replaced or overcome by the influence of the approaching colour on the right, considering the spectrum colours as laid out in a circle and proceeding clockwise. This is an important point in determining the difficult colours in the violet-blue classes. The delicate tones of mauve, lilac and lavender will be represented in further volumes of the chart, as these are, of course, tints and " greyed hues " of the violet-blue series, and their correct place in the spectrum will be easily found by following the system of numbering the sheets as set forth in the Introduction. Again the strong difference on the colours of so-called " red " Roses will be noted from their position in the spectrum, with the orange-reds, such as the ‘ Paul Crampel ’ group, influenced by the orange, far away from the crimsons, which come into the violet-red types and are influenced by the blue.

Arranging the sixty-four sheets in a large circle in order will go far to demonstrate the differences in colour.

The sheets following No. 64 are each related to one of the sixty-four, being either a tint, shade or " greyed hue " of the complementary number. (" Greyed hues " are those colours to which a certain percentage of grey has been added, as opposed to pure colours.) For example, Sheet No. 616 gives a series of tints (lighter tones) of Sheet No. 16 and Sheet No. 719 a series of shades (darker tones) of Sheet No. 19—the initial 6 or 7 of the number indicating whether tint or shade respectively. The series is not complete, as it was the main object of the compilers to give the most useful colours for horticultural purposes in Vol. I, some hundreds of examples having been matched to obtain this selection. Succeeding volumes will have sheets to fill in the gaps to complete the series.

If further justification for the issue of the chart were necessary, the following examples of diversity in description taken at random from Nurserymen's catalogues will show the desirability of standardized colour description, particularly as colour schemes now take such an important place in garden-design.

Buddleia Davidi magnifica	(*a*) Violet
	(*b*) Purple
	(*c*) Lavender.
Ceanothus ‘ Gloire de Versailles ’	(*a*) Amethyst blue
	(*b*) Rich blue
	(*c*) Sky blue.
Rose ‘ Hortulanus Budde ’	(*a*) Dark red
	(*b*) Scarlet
	(*c*) Deep orange-crimson.
Rose ‘ Angèle Pernet ’	(*a*) Orange-yellow, shaded fiery deep reddish apricot
	(*b*) Orange-red
	(*c*) Grenadine pink.
Nigella ‘ Miss Jekyll ’	(*a*) Light blue
	(*b*) Medium blue
	(*c*) Cornflower blue.

Rose 'Betty Uprichard'	(*a*) Carmine and rose (*b*) Soft salmon pink (*c*) Carmine and orange (*d*) Salmon pink and carmine.
Rose 'Catalonia'	(*a*) Cardinal red with yellow base (*b*) Geranium scarlet (*c*) Rich carmine flushed orange (*d*) Bright fiery crimson red, shaded gold.

We must, I think, expect some diversity of result in matching, and this in itself will be of value, as it will then be possible to estimate whether the flower colours do differ in the same species, how much, and under what conditions of climate or soil. I have once tested the oft-repeated statement that the flowers of the Alps are of a much brighter colour than the same species grown in our rock-gardens, taking *Gentiana acaulis* as an example. This I matched with the Ridgway Chart both in Switzerland and in England, on a bright day, and found that they both matched the same colour in the chart, so that the answer to this appears to be a difference in light rather than actual colour.

The personal factor also must be taken into account, but except in the case of colour-blindness there should not be much difficulty in obtaining correct results if the directions are closely followed, and a little practice soon puts one in the way of recognizing colours and the eye becomes quickly educated to the work.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXXXVII.—AMARYLLIS PESTS.

By G. Fox Wilson, N.D.H., F.R.E.S., F.L.S., Entomologist.

This investigation was begun with the idea of ascertaining, first, the pests of Amaryllis bulbs, more especially those that give rise to reddish spots and streaks on the bulb, leaves and flower-stem, and, secondly, to discover the species of Mite primarily responsible for the reddening of the leaves as they emerge from the bulb and to devise measures for the prevention of such injury.

The pests of Amaryllis (Hippeastrum) in the United States have been discussed by Floyd F. Smith,* who classifies them as follows: (A) Insects causing spotting of the leaves and bulbs (Thrips, Aphides, Mealy Bugs, Scale insects, Red Spiders, the Bulb mite, and a Tarsonemid mite); (B) Insects devouring the foliage and flowers (a Grasshopper, the larvæ of four species of Noctuid moths and of one species of Sphingid moth, and a Blister beetle); and (C) Insects burrowing in the bulbs (Bulb flies).

The chief pests of the genus in this country are: (1) the Bulb mite, *Rhizoglyphus echinopus* Fum. and Robin; (2) the Bulb-Scale mite, *Tarsonemus laticeps* Halbert; (3) the Glasshouse Red Spider, *Tetranychus telarius* Linn.; (4) Thrips: the Palm Thrips, *Parthenothrips dracaenae* Heeg., and the Beet Thrips, *Heliothrips femoralis* Reut. (Miles †); (5) Mealy Bug, *Pseudococcus maritimus* Erhr.; and (6) the Bulb or Narcissus fly, *Merodon equestris* Fab.

The pests chiefly responsible for the red staining on the leaves due to the formation of anthocyanin pigment are the Bulb-Scale mite, the Glasshouse Red Spider, Thrips and Mealy Bug, while the Bulb mite is frequently the agent concerned with the production of red spots on the outer scales of the bulb.

The control of such open feeders as Red Spider, Thrips and Mealy Bug presents but little difficulty provided that routine fumigation with Nicotine vapour and periodic sprayings of both surfaces of the leaves with Derris, Nicotine or Pyrethrum washes are carried out. The control, however, of the pests which are hidden beneath the outer bulb scales (the Bulb mite) or are congregated and feed between the scales in the region of the neck of the bulb and between the inner scale-leaves (Tarsonemid mite) required investigation so far as Amaryllis bulbs were concerned.

It is of interest to review some early references to the injury to

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* American Amaryllis Society Yearbook, 1934, Vol. I, pp. 94–96.

† Insect Pests of Glasshouse Crops, 1935, pp. 101–102.

Amaryllis bulbs by mites, and the following abstracts refer to such infestations.

An account is given by VEITCH * of the so-called Eucharis mite on Hippeastrum, in which it is stated : " Much has been written in the horticultural press about the mite that appears both on the Eucharis and on the Hippeastrum, but we have no fear of it. In my opinion its prevention is simply a matter of not over-potting and not over-watering, and we have seldom seen bulbs however badly affected that could not be brought into perfect health again." This statement may well apply to such a pest as the Bulb mite, but only partially to the Tarsonemid mite, which is not affected to any degree by good cultivation. The effect of over-watering, however, is a factor that may favour the Tarsonemid mite, for it is intolerant of dry conditions.

Later, SAUNDERS † stated that the mites found in Amaryllis bulbs were undoubtedly the Bulb mite, *Rhizoglyphus echinopus*, and " as to destroying the pest, he suggested sterilizing the soil the plants are growing in, and soaking the bulbs in hot water of a temperature of 125° F. for about ten minutes to kill the mites in them." This early reference to the hot-water treatment of mite-infested bulbs is of special interest, but it will be shown later that the period of immersion is too short to secure high mortality of the mites situated within the inner recesses of the scale-leaves of a mature bulb.

The remaining part of this paper is devoted to a discussion of the Tarsonemid mite concerned in the reddening of the leaves and flower stems of Amaryllis bulbs, its systematics, biology, and measures for preventing and remedying infestations.

The Bulb-Scale Mite, Tarsonemus laticeps Halbert.

The fact that some hidden pest was concerned with the reddening of the foliage was suspected when it was observed that red streaks and spots appeared on the leaves as they emerged from the neck region, the red areas elongating as growth proceeded, the phenomenon resembling that of the printed tape from a tape-machine (fig. 71).

It was evident, also, that a minute pest was at work owing to the comparatively narrow space between the developing leaves and flower stem. Infested bulbs were dissected as soon as the red discoloration of the emerging leaves was observed, and a number of pearly white eggs, white immature six-legged mites and caramel-coloured adults (fig. 72) were found congregating in the neck region of the bulb and between the inner scale-leaves to a depth of 3 inches from the apical region. A number of these mites was submitted to Dr. A. M. MASSEE with a request to compare the specimens with type material of *Tarsonemus laticeps* described by him in 1933 as *T. approximatus* Banks var. *narcissi* Ewing.‡

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* R.H.S. Jour., 1890, **12**, pp. 253–254.

† R.H.S. Jour., 1908, **33**, pp. xxiv–xxv.

‡ Ann. Mag Nat. Hist., 1933, **11**, pp. 198–201.

The reply received (letter dated March 31, 1939) was as follows: " I have compared the material from Amaryllis with the slide preparations of *T. approximatus* var. *narcissi* and find it to be identical. In addition I have the original description of *T. laticeps* Halbert 1923 and your material agrees with this description. It is important, however, that EWING admits that his species var. *narcissi* is a synonym of *T. laticeps*. Under the circumstances your material from Amaryllis must be referred to *T. laticeps* Halbert 1923." Dr. MASSEE then outlined his reasons for stating, after careful thought on the matter, that the species concerned is *laticeps*.

Systematics.—BLATTNY * reported that the " Red-Burner " (*Roter Brenner*) disease of Amaryllis was caused by a Tarsonemid mite, which was described by Dr. STORKAN of Prague as almost certainly identical with *T. hydrocephalus* described originally by VITZTHUM † from specimens collected by TULLGREEN on *Pancratium*. This mite was first noted by BLATTNY in 1930 in a glasshouse in mid-Bohemia.

EWING ‡ has recently revised the classification of the Mites of the Sub-Family *Tarsoneminae* of North America, and there considers that the *T. hydrocephalus* of Vitzthum is synonymous with the Bulb-Scale mite, *T. approximatus* Banks var. *narcissi* Ewing.§ Both these species are, according to EWING (1939), referable to *T. laticeps*, which was described by HALBERT || in 1923, and this name has priority. The host plants in the United States are said to be Narcissus and Amaryllis.

In February, 1939, an experiment was carried out at Wisley to discover whether adult Bulb-Scale mites from infested Narcissus bulbs would live and breed in Amaryllis, which were known to be sound and free from pests. It was soon apparent that the mites from Narcissus were feeding on their new host, for the hitherto healthy leaves of the Amaryllis soon showed signs of reddish streaks at their base as they elongated from the bulbs. Breeding began a week or so after the transference was made, and there soon developed an active colony within the neck region and among the upper portions of the inner scale-leaves.

SMITH (*loc. cit.*) reported that a mite, known as *T. hydrocephalus*, was discovered to be injurious to Amaryllis in greenhouses in Germany, but that this species was unknown in America, though a related form was rather widespread on Narcissus in the United States, and may also attack Amaryllis.

The opinion of SMITH, whose biological investigations on Tarsonemid mites in general are well known, was sought and a request made as to whether *T. hydrocephalus* of Vitzthum had since occurred on Amaryllidaceous plants in North America. In his reply (letter dated

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* Gartenbauwissenschaft, 1933, **7**, pp. 489–495.

† Ent. Tidskr., 1929, **50**, 2, p. 102.

‡ U.S. Dep. Agric. Tech. Bull. No. 653, 1939, pp. 15–18.

§ Proc. Ent. Soc. Washington, 1929, **31**, pp. 31–32.

|| Journ. Linnean Soc. Zool., 1923, **35**, p. 381.

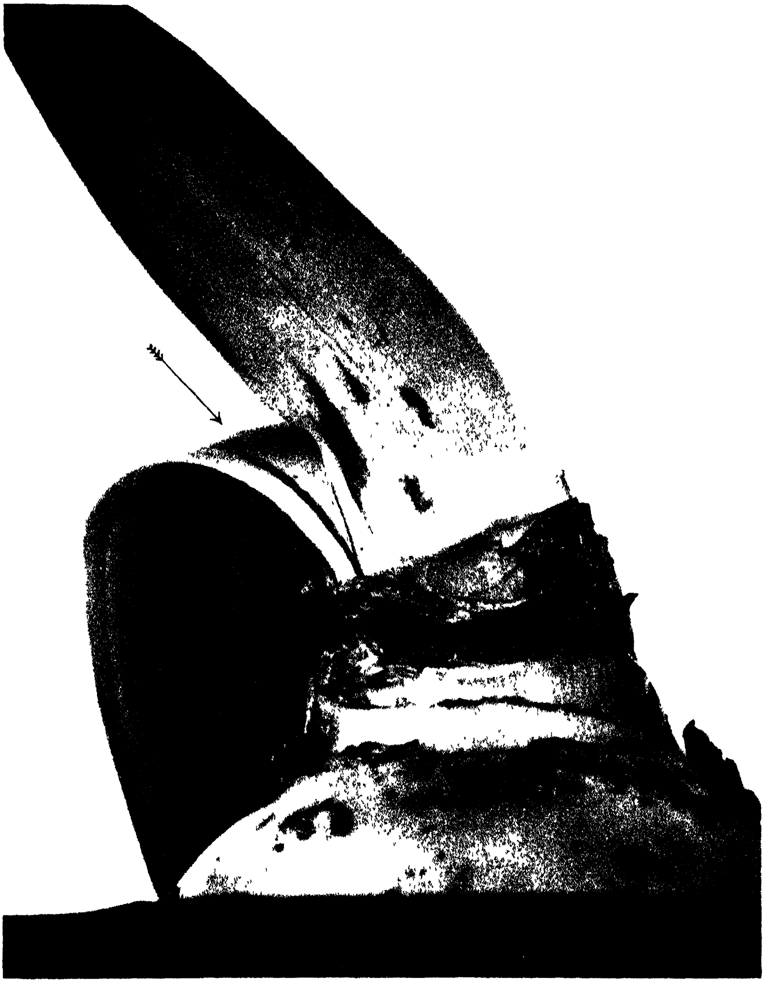

FIG. 71. HIPPEASTRUM LEAF SHOWING SIGNS OF ATTACK BY TARSONEMID MITE.

Note the elongation of red scar as growth proceeds.

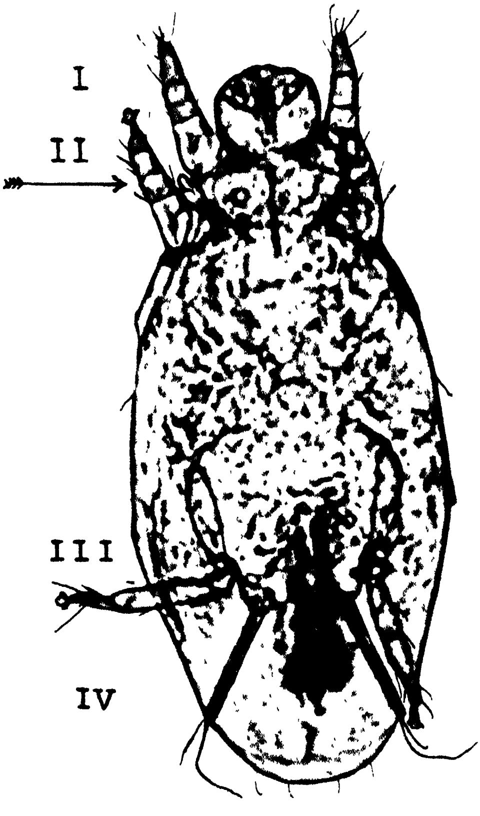

FIG. 72 TARSONEMUS LATICEPS
Adult female, greatly enlarged

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February 17, 1939) he stated: "According to the work of C. F. DOUCETTE of the Bureau of Entomology, the Tarsonemus attacking Amaryllis is the same species that attacks Narcissus, and mites may be successfully transferred from one host to the other. Both Amaryllis and Narcissus are naturally infested in this country."

It is unnecessary to give technical descriptions of this Tarsonemid mite, for such have been given in detail by EWING and MASSEE (*loc. cit.*).

The adult mites are very minute, being about 1/100th–1/120th of an inch in length and caramel-coloured. The sexes are readily distinguishable under the high power of the microscope by the possession in the male of clasping hind-legs, and by the female of reduced hind-legs terminating in long bristles (fig. 72). The female, like most other Tarsonemid mites, has a pair of prominent clavate (clubbed) organs situated between the first and second pairs of legs.

The oval ivory-white eggs are relatively large for the size of the female mite.

The larva, which is six-footed, is colourless, glistening and, when mature, almost as large as the adult. These larvæ are difficult to detect against the colourless background of the inner scales of an infested bulb

The signs of attack by the Bulb-Scale mite in Narcissus bulbs, both in the dormant bulb, forced bulb, and in the field, have been fully described by HODSON.*

So far as our observations go, there is considerable identity of symptoms between those noted by HODSON in Narcissus and by us in Amaryllis, but they were accentuated in the latter bulbs owing to the brilliancy of the reddening on the attacked leaf surfaces and on the flower stem. When Amaryllis bulbs are brought from the storage-room into a heated glasshouse, there occurs a rapid increase in the mite population, chiefly in the neck region. HODSON states that in Narcissus bulbs many of the mites may be found, even during the day, distributed over the foliage, and that eggs are often deposited many inches above ground level on both surfaces of the leaves, though, it is added, eggs laid in such exposed sites rarely hatch. The author has not so far seen Amaryllis bulbs supporting such a high population of mites that they have overcome their dislike of light to move about on the exposed leaf surfaces. The mites avoid light by living far down in the neck of the bulbs and among the inner scales.

According to BLATTNY (*loc. cit.*), the mites are active between 10° and 20° C. (50–68° F.), becoming motionless at 3·5° C. (38·3° F.), at which temperature no eggs hatch. Their numbers decrease in summer, for they appear to be intolerant of dry conditions, so that less injury is apparent at this season. It was found that young plants were less infested than three- to five-year-old bulbs, this being also noted by BLATTNY.

The first indication of mite infestation is that reddish streaks and spots appear on the elongating leaves. This reddening is intensified on the upper parts of both sides of the bulb-scales, and may extend down into the bulbs for some distance. These reddish lesions elongate as growth increases, and may ultimately constitute a scar several inches in length (fig. 71).

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* Bull. Entom. Research, 1934, **25**, pp. 177–185.

BLATTNY reports that in severe infestations the flowers shrivel or the flower stems remain short and that the original surface lesions become deeper and shrivelled, that the leaves and stems are poorly developed, and finally the entire bulb may decompose, since secondary agents, such as the Bulb mite, and bacteria and fungi, may follow the primary attack of the Tarsonemid.

This author further states that any certain diagnosis of Tarsonemid mite attack is difficult unless the mites themselves are found, since almost any form of injury to Amaryllis causes the "red-burn" symptom. While it is possible to agree with the statement that most forms of injury to these bulbs give rise to a reddening of the attacked tissues, it is the author's opinion that Tarsonemid mites *only* give rise to a reddening of the leaf tissues *before they emerge from the bulb.* Bulb mites are frequently found on the outside of the bulbs, more especially beneath the dried outer scales, and their feeding gives rise to reddish spots. These mites are not, however, seen in the innermost regions of the bulbs unless the bulb is decomposed, and they are not, therefore, responsible for the typical reddening of the leaf tissues seen on the emerging leaves.

The Bulb mite is easily visible to the naked eye, while the adult Tarsonemid mite is scarcely visible and its larva not at all.

BLATTNY was convinced by inoculation experiments that *T. hydrocephalus* is a primary pest of Amaryllis bulbs, and describes a number of experiments in which he successfully bred the mites in sound bulbs. The mites which he placed in healthy bulbs increased in numbers and typical "red-burn" symptoms appeared in three months.

The author was likewise convinced that the primary attack on Amaryllis bulbs was due to a Tarsonemid mite, and suspected that the Narcissus Bulb-Scale mite was concerned. It was found possible to transfer Tarsonemid mites from infested Narcissus bulbs to sound Amaryllis bulbs, but there was a shorter period between the time of artificially infesting the bulbs and that when the first signs of attack became apparent. Five mites (four females and one male) were removed with the aid of a fine-pointed camel-hair brush from an infested Narcissus bulb and transferred to the neck region of a healthy Amaryllis bulb on February 9, 1939. The apical areas of two leaves began to appear from the bulb on February 11, and the typical reddish streaks were noted on February 22, that is, thirteen days after the transference was made (fig. 71).

BLATTNY further reports that inoculation experiments on Hyacinth gave negative results and attacks have only been seen on Amaryllis. He was able to breed the mites on artificial media, that is, a decoction of Hyacinth bulbs, and states that he is of the opinion that other bulbs for forcing could be attacked. It would be of interest to know whether he has since used Narcissi in his experiments.

The influence of external factors on the incidence of the pest was also studied by BLATTNY, who states that such factors markedly affect the course of the disease. It was found that during the winter-resting period of Amaryllis bulbs, the lower the temperature, the less the humidity, and the lighter the storage-room, the smaller is the danger of an infestation and the milder the course of the disease.

Since well-lighted positions and cold and dry air are factors unfavourable to the mites, it is possible to supply such conditions for reducing and preventing attacks. BLATTNY found that bulbs kept over winter at 8–12° C. (46–53° F.), and at 70–95 per cent. relative humidity in darkness, showed 30 per cent. infestation compared with 10 per cent. infestation in bulbs kept under similar conditions at 2–6° C. (35–43° F.), and 40–75 per cent. relative humidity in light.

Mr. CLIVE COOKSON, to whom I am indebted for sending me several observations on Amaryllis mite attacks and for supplying me with bulbs for hot-water treatment, wrote (February 6, 1939): "I notice this year that the bulbs which show the least sign of attack are those that last year were placed in a frame in which the temperature rose on occasion to 90–95° F. (32–35° C.) for short periods." While the thermal death point of the mites varies from 100–120° F., it is not known whether the reduction in attack in this particular instance was due entirely to the high temperatures prevailing in the frame or to other factors, e.g. to the normal decrease in mite population that occurs during the summer owing to the intolerance of the mites of dry conditions.

Preventive and Remedial Measures.—An infestation of Tarsonemid mites may be carried over from season to season in the plunging material despite the hot-water treatment of infested bulbs, which will become reinfested as soon as they are replaced in such material. It is desirable, therefore, to remove the plunging material (cinders, coke breeze, fibre or sand) from the beds and either to discard it and replace with fresh, clean material, or to subject it to steam sterilization.

The fumigation of the storage-room and forcing-house with either naphthalene or sulphur was found to be ineffective owing no doubt to the fact that the vapours are unable to penetrate completely either into the litter in the store or into the interstices of the brick- and woodwork surrounding the plunging bed of the forcing-house, and in which some of the pre-adult resting larvæ may be sheltering. It is found that thorough soaking of the floor of the plunging bed, after all the plunging material is removed, and of the surrounding walls and staging with boiling water results in a higher mortality of the resting mites than either fumigation or dusting with the general acaricides (naphthalene and sulphur).

The pots (and crocks) in which infested bulbs have been grown should be immersed in boiling water for several minutes to destroy any mites which may be adhering to them.

Hot-Water Treatment of Amaryllis Bulbs.—The earliest published record of the hot-water treatment as applied to Amaryllis bulbs has already been noted (SAUNDERS, *loc. cit.*), but we have no further information on the result of the treatment. The temperature suggested was 125° F., and the period of immersion about ten minutes. It was found, however, in the Wisley experiments, that this period is not sufficiently long to enable the temperature within a 3- or 4-year-old bulb to be raised to that requisite to destroy all the mites within the inner scales.

BLATTNY, after two years' trials, recommends the immersion of the bulbs, before their winter rest, in water at 40° C. (104° F.) for 30 minutes.

SMITH advises immersing the dormant bulbs in hot water for one hour at a temperature of 110–111·5° F. (43–44° C.), after which the bulbs should be dried and planted in an isolated position to prevent reinfestation. He further advises the destruction by fire of severely damaged bulbs.

The work of BLATTNY and SMITH was unknown to the author until some time after the hot-water treatment of Amaryllis bulbs had been carried out at Wisley, but the results which were obtained confirmed those of the earlier workers.

Through the kindness of Mr. CLIVE COOKSON, ten 3- and 4-year-old mite-infested bulbs were received at the end of September, 1938. The foliage was dying down, and the bulbs were placed in a dry store until they were completely dormant and the foliage came away when pulled.

Eight bulbs were immersed for varying periods of time in hot water at a constant temperature of 110° F. (43° C.) on November 1, 1938. After immersion, the bulbs were either allowed to cool naturally (slow cooling) or were immersed for 5 minutes in cold water (rapid cooling). All the bulbs were dried thoroughly, and were then potted into 5-inch pots in sterilized soil, and placed in a glasshouse with a mean temperature of 60° F.

Details of the treatment meted out to the bulbs will be seen in Table I, and their subsequent growth in figs. 73, 74 and 75.

TABLE I.

No	Period of Immersion	Later Treatment.	Growth Commenced	In Flower
1	Untreated (Control)	—	Jan. 23, 1939	March 8, 1939
2	Untreated (Control)	—	Feb. 3, 1939	—
3	20 minutes	Slow Cooling	Dec. 2, 1938	March 1, 1939
4	20 minutes	Rapid Cooling	Dec. 15, 1938	Feb 18, 1939
5	30 minutes	Slow Cooling	Dec. 15, 1938	—
6	30 minutes	Rapid Cooling	Jan. 24, 1939	—
7	60 minutes	Slow Cooling	Dec. 15, 1938	Feb. 11, 1939
8	60 minutes	Rapid Cooling	Jan. 11, 1939	—
9	90 minutes	Slow Cooling	Dec. 6, 1938	Feb. 2, 1939
10	90 minutes	Rapid Cooling	Jan. 4, 1939	—

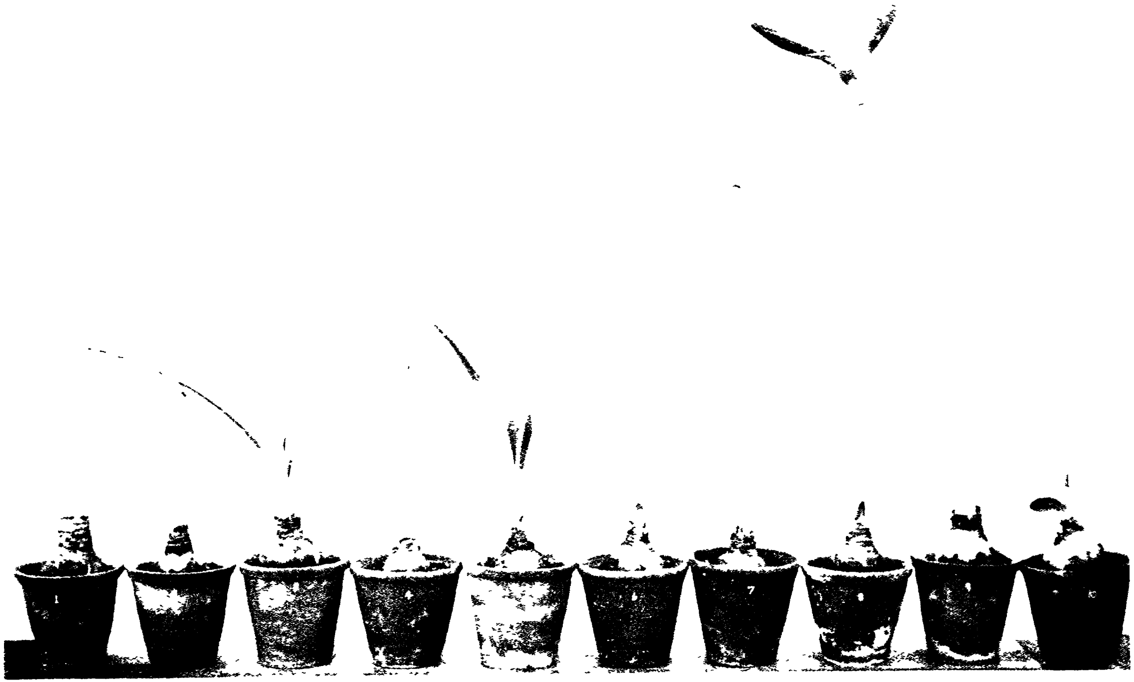

FIG. 73.—UNTREATED (1 AND 2) AND HOT-WATER-TREATED (3 TO 10) BULBS OF HIPPEASTRUM
(Treated November 1, 1938; photographed January 31, 1939.)

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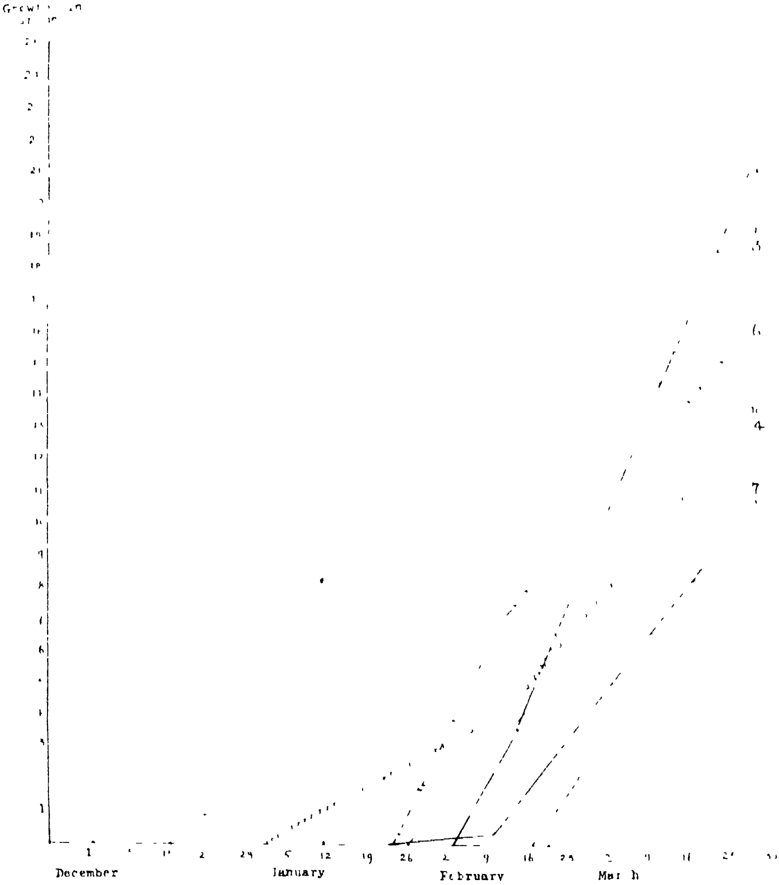

FIG. 71 LEAF GROWTH OF HIPPEASTRUM
Nos. 1 and 2 untreated, 3-10 hot water-treated

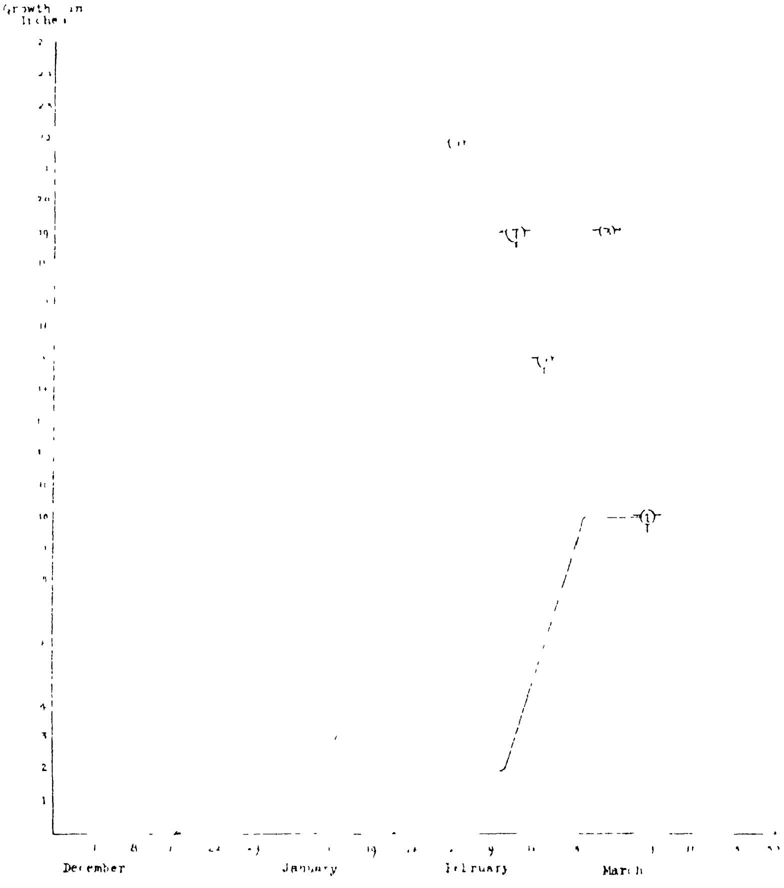

FIG. 75.—FLOWER STEM GROWTH AND FLOWERING PERIOD OF HIPPEASTRUM
Nos. 1 and 2 untreated, 3 to hot-water-treated

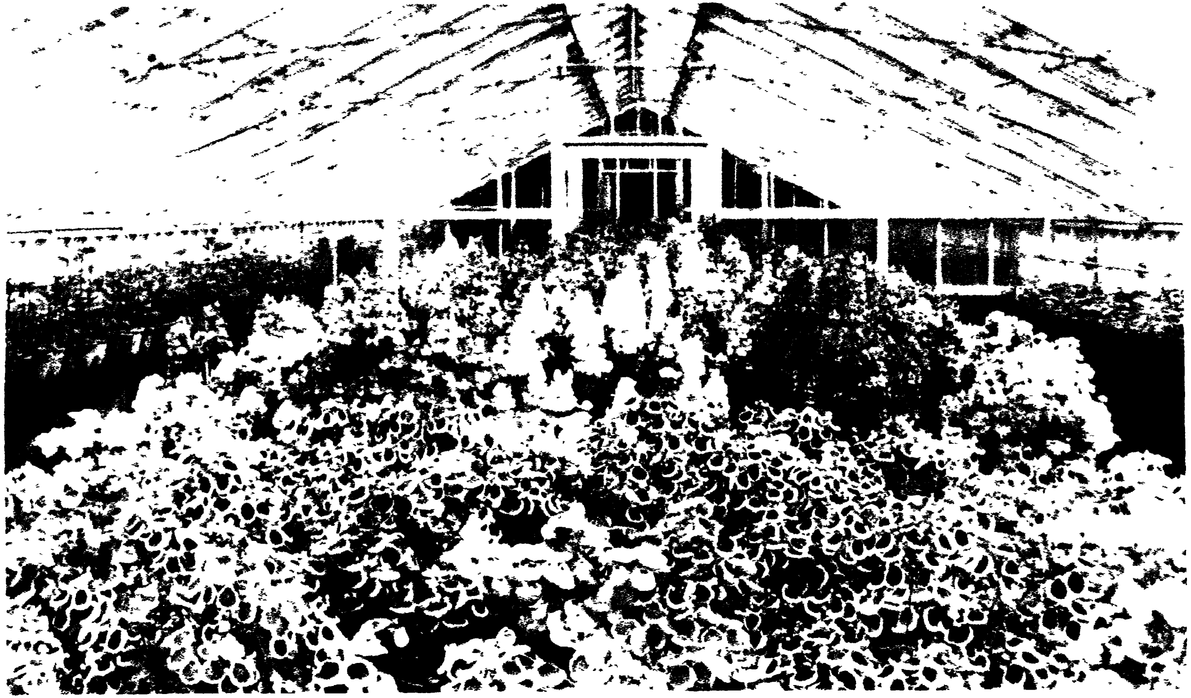

FIG. 76.—SCHIZANTHUS AND CALCEOLARIAS ON TRIAL AT WISLEY

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It will be noted (fig. 73) that the bulbs which were immersed in hot water and cooled naturally not only produced more vigorous growth but that the flowering period was considerably accelerated (Nos. 7 and 9 in particular). The effect of rapid cooling on the bulbs subjected to 30, 60 and 90 minutes' immersion in hot water was to retard growth considerably (Nos. 6, 8 and 10). Unfortunately only five of the ten bulbs produced flowering stems, so that the effect on the period of blooming of all the bulbs could not be ascertained. It was found that the pollen of the bulbs subjected to hot-water treatment which flowered was viable, fertilization of the ovules occurring and a quantity of seed being obtained.

Injury to the leaves as a result of the hot-water treatment occurred only in those bulbs which were subjected to rapid cooling, and the leaves of Nos. 6 and 8 showed roughened and corrugated areas similar in appearance to the type of injury that occurs on Narcissus leaves as a result of faulty sterilizing. The leaves of No. 10 were malformed and twisted, and never recovered their normal form following the rapid cooling to which this bulb was subjected after 90 minutes' immersion in hot water.

STANILAND* stated that there was no difference between the rapid and natural cooling of Narcissus bulbs after the late treatments, but after the early treatments there was rather more damage to the flowers in the rapidly cooled bulbs. The damage, however, was not very serious, being confined to the edge of the corona. The damage to the Amaryllis bulbs, with the exception of No. 10, was not serious but was apparent.

In addition to the hot-water treatment, BLATTNY further suggested the immersion of the bulbs before planting for forcing in a 0·3 per cent. solution of Uspulun-Universal for 30 minutes, after which they should be placed in a warm place and planted after one or two days. This additional treatment was said to assist flowering of both young and 4-year-old bulbs and to cause a marked development in growth.

During forcing, it is desirable to reduce the humidity of both the air and the soil as low as possible having due regard to the conditions essential to successful forcing, so that the drier conditions will affect any mites that may have escaped the previous treatments. The critical period of attack is that which follows the removal of the bulbs from the storage-room to the forcing-house, and a hastening of the initial stages of growth will help to reduce the amount of injury by the mites.

As a result of the hot-water treatment followed by an immersion of the bulbs in Uspulun solution, and by the provision of dry conditions in the forcing-house, BLATTNY was able to reduce an original attack of 46 per cent. to 13 per cent. The remaining 13 per cent. were found to be so badly attacked that growth was very poor, and they were again treated in hot water, planted immediately, and after one week were sprayed with a Pyrethrum preparation so that the fluid penetrated between the opening bulb scales. This spraying was repeated again during the summer, and the attack thereby was reduced by a further 9 per cent. The remaining bulbs—4 per cent. of the total—were too badly injured by the mite to be worth further treatment.

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* 14th Ann. Rept. Seale-Hayne Agric. College, 1937, No. 48, pp. 33–34.

My sincere thanks for help received in the preparation of this paper are given to Mr. CLIVE COOKSON for supplying me with material for treatment; to Mr. C. T. GIMINGHAM, O.B.E., B.Sc., for drawing my attention to and sending me a translation of BLATTNY'S paper; to Dr. A. M. MASSEE for identifying the species of Tarsonemid mite concerned in the infestation; to Dr. FLOYD F. SMITH for supplying me with numerous data and references; and to my colleague, Mr. F. C. BROWN, for the photographs reproduced here.

SWEET-CORN.

By Champion B. Russell, M.A.

In the early nineties I grew Maize as a fodder crop without difficulty, and came to the conclusion that though the cobs could not be harvested every year without artificial drying, some kinds would always ripen enough for cooking as a vegetable. I took as my handbook Cobbett's Corn—delightful reading for anyone who cares for very vigorous prose. William Cobbett was cocksure that it would pay better to grow maize than wheat in England, and he wrote this treatise to prove his case. He also introduced ' Cobbett's Corn ' as the kind best suited to our climate. I have little doubt that this was " chicken corn," the only variety which had any chance of bringing a crop upon fresh broken prairie in Nebraska. It is a small-stemmed, small-grained variety, early and very hardy, and is called ' Six-weeks ' in our catalogues. In 1896 I drilled two acres of maize in south-east Essex ; most of it was ' Six-weeks,' but there were a few rows of ' White Pyrenean,' and various sorts of sweet- or sugar-corn. The ' Six-weeks ' and ' Pyrenean ' did well, but the sugar-corn was a failure ; very little of it came up, the ground being too cold, and hardly any cobs " set." The green cobs of the ' Six-weeks ' were unsaleable ; the grain ripened well. The ' Pyrenean ' has a good-sized white grain, is hardy, and the earliest kind I have grown. In later years I tried dozens of varieties, always buying any new kind that seemed likely to succeed—and my " stand-by " varieties were (in order of readiness for the cook) : 1. ' White Pyrenean ' ; 2. ' Early Yellow ' (a small quantity : it ripens quickly, and is only saleable before it has turned yellow) ; 3. ' Pocahontas,' a sugar-corn the most reliable I discovered ; 4. ' Hickory King,' a white field-corn, in high repute for cooking in S. Africa ; 5. ' Northern Den,' a magnificent fodder plant. The cobs sell well at the end of the season, even before they reach the milky stage, owing to their splendid appearance. Had I been growing for my own table I should have grown mainly sugar-corn, starting them under glass, and planting out in a sheltered place. I should have included such kinds as ' Golden Bantam,' ' Howling Mob,' ' Country Gentleman ' and ' Black Mexican ' —the last, worth growing for field-work, is of excellent quality, though not a sugar-corn. My choice, however, was dictated by market conditions. I could not sell any quantity of small or of yellow cobs, however good their quality might be. Indeed it was much harder to sell the " bhutas " (as the cobs are called in India) than to grow them. At first the shop-managers would take no interest : " We have no demand for that here " ; nor would they even put it on show, though I offered good terms : " not to be paid for, if not sold." At one shop the manager was turning it down as usual, when a lady rushed across from a counter opposite, saying, "I *must* have some of those"; and before she had left another lady asked for a dozen. The ladies brought faith to the recusant, who became a regular customer. I went so far as to print a pamphlet, Green Corn, which was sent to all who were likely to be interested and become buyers, through Muxworthy of Covent Garden, who bought wholesale and graded the corn to suit individual customers, *e.g.* the less developed cobs found favour with Austrians, the right milky with Americans, the riper ones with South Africans. A trade might be easily worked up in the large stalks for decoration, especially those with red "silks" (female inflorescence); they pack in bundles quite well, last in water, and make a noble show for domestic decoration and harvest festivals.

The critical times for the crop are during germination and flowering. If the soil is too cold, the seed rots—especially the sweet- or sugar-corn—but when the seedling is well out of the ground, it stands a good deal of cold, and often recovers when yellowed by frost.

If there be a cold time for setting the seed, many of the cobs will be blind or sparsely filled; and the sugar-corn may completely fail. We found close planting a great help; two-foot drills were ample for shorter kinds, three-foot for the very tallest. We aimed at having the plants 8 inches apart in the rows. Of course, if one wished to ripen the grain, they should be further apart, and the drills should run north to south. Close planting tempers the wind to the pollen-grains. The third great danger is from rooks, which are desperately fond of the young shoots of sugar-corn. The best preventives are the feathers and *disjecta membra* of young rooks, kept over from rook-shooting. Like mice with a taste for broad beans, the rooks do not know where to dig for the seed, until invited by the scent of germination, as happens also with marrow seeds.

Maize appreciates rich soil, a good seed-bed, deep and frequent cultivation, and moulding up just before the stems get too tall for the horse-hoe. The heavier the crop, the richer the ground will be for the next crop. If I were growing for show, I should cut off a fair proportion of the tassels (male bloom) before the pollen is formed, as the emasculated plants seem to have rather better cobs.

The stalks make wonderful fodder. I used to put any surplus into a pit lined with hedge-trimmings; it was built up five or six feet above ground level, and when the stack had sunk finally to a little over ground level, the centre being kept higher to throw off the rain, it was covered with plenty of trimmings; and then the excavated earth was thrown on the top to a depth of a foot or more, to weigh it down. For several years this answered splendidly. The stems were pulled out in sheaves, tied with string, just as they had been put in, and when chaffed the goodly smell made everything mixed with it palatable. But a year came when the water-level rose within two feet of the surface, and below that all was spoilt.

I have little doubt that maize will follow the northward migration of the 'Marquis' wheat, and kinds will be evolved that will stand the rigour of more northern climates. Something might be learned from the Experimental Stations of Canada and the Northern States of America.

The seed catalogues tell very little of the treatment necessary for different kinds ; nor did the firms who sent them out trouble to answer the inquiries of a man who sent small orders. The books which I bought on the subject were not helpful, and I have learned that general rules do not apply to all varieties. It is more than ten years since I was a serious grower of the cobs. ' Green Corn ' had become a regular crop with a good many growers, who had better soil for the purpose, and above all a better climate. But it was great fun so long as I had a monopoly. Nowadays, except in an extra cold, wet year, the supply exceeds the demand, and in such a year one may have to count losses instead of gains.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Adiantum pedatum var. japonicum. A.M. May 16, 1939. From Messrs. Perry, Enfield. A very attractive hardy fern forming a light mass of arching fronds, bronze-tinted while young, light green at maturity. The variety differs from the type in having longer and wider daintily frilled pinnules.

Anemone umbellata. A.M. May 16, 1939. From Dr. N. W. Jenkin, Hindhead. A pretty species collected by the exhibitor on Mount Kasbek in the Caucasus. The flower is 1½ inch in diameter with six bright rose sepals and a central cluster of yellow stamens; five or six are borne on an 8-inch scape rising from a basal rosette of long-stalked, lobed and toothed hairy leaves.

Berberis valdiviana. A.M. May 2, 1939. From Lady Lawrence, Dorking. This very uncommon and distinct Chilean species forms a handsome, compactly branched bush of comparatively rapid growth. The stiff stems are densely clothed with dark, glossy, somewhat pendulous, entire, elliptical leaves 2 to 3 inches long; occasionally replaced by stout, three-parted spines. The small globular saffron-yellow flowers are borne in dense, drooping racemes of twenty or thirty.

Brassia sp., allied to *B. longissima*. **A.M.** May 16, 1939. The spike bore several flowers with much elongated sepals and petals of greenish-yellow. Native of Costa Rica. Exhibited by Messrs. Mansell & Hatcher, Rawdon.

Calanthe striata Sieboldii elegantissima. A.M. May 2, 1939. From Lord Aberconway, V.M.H., Bodnant. A Japanese terrestrial Orchid suitable for the alpine house. The plant produces several broadly ovate-elliptical plaited leaves 6 to 8 inches long at flowering-time: and an erect scape about 20 inches long bearing about thirty closely racemed flowers. The white three-lobed lip is surrounded by five spreading, lanceolate segments of Dresden-yellow (H. C. C. 64/3).

Carnation 'Maytime.' A.M. May 16, 1939. From Messrs. Allwood Bros., Haywards Heath. A perpetual flowering variety of good robust habit, producing freely flowers in succession on long stiff stems, fully 3½ inches across, full centred, somewhat scented, of a soft light rose-pink shade, margins of petals slightly serrated; calyx strong.

Crinum Laurentii. A.M. May 16, 1939. From Mrs. J. B. Akroyd, Limpsfield. This distinct species was first discovered in the Belgian Congo in 1895, and flowered the following year in the Botanic Garden at Brussels. The bulb produces a cluster of about twelve narrow, undulate, arching leaves 2 feet long, and an erect scape 2 feet high bearing an umbel of five flowers. The flower has a narrow curved greenish tube 8 inches long and six spreading, oblanceolate, ivory-white segments.

Cymbidium × 'Dorchester,' Orchidhurst var. A.M. May 16, 1939. The spike bore five flowers of moderate size, ivory-white, the front lobe of the labellum pinkish, and the column dark red. The result of crossing *C.* × *Alexanderi* with *C.* × 'Tityus.' Exhibited by Messrs. Armstrong & Brown, Tunbridge Wells.

Cymbidium × 'Profusion' var. 'Cherioma.' A.M. May 16, 1939. The spike bore thirteen flowers of large size, cream ground with reddish suffusion and darker venation, the labellum marked with crimson on the front lobe. The result of crossing *C.* × 'Vesta' with *C.* × 'Ceres.' Exhibited by Messrs. McBean, Cooksbridge.

Fritillaria Guicciardii. A.M. May 16, 1939. From G. P. Baker, Esq., V.M.H., Sevenoaks. A small species from Greece, suitable for the alpine house. The plant is 4 inches high, with several glaucous linear or oblanceolate leaves and a solitary nodding flower yellowish-green within and suffused with chocolate on a greenish ground externally.

Helichrysum virgineum. A.M. May 16, 1939. From Mrs. Gwendolyn Anley, Woking. This small species produces a cluster of white-tomentose, oblanceolate leaves and short, ascending stems, each bearing four or five globular, soft pink flower-heads.

Iris × 'Tol-long.' A.M. May 16, 1939. From Mr. Amos Perry, Enfield. A hybrid between *I. Tolmieana* and *I. longipetala*, raised by Sir Michael Foster. A hardy free-flowering hybrid with grass-like foliage and medium-sized flowers; standards 2½ inches long, ½ inch wide, soft bluish-violet, falls drooping 1¾ inch wide by 1¼ inch long, white, veined bluish-violet, midrib stained yellow.

Lycaste × 'Lady Colman' var. 'Golden Queen.' A.M. May 16, 1939. This interesting hybrid between *L. Imschootiana alba* and *L. Locusta* bore an elegant saffron-yellow flower, and having well-formed segments of thick texture. Exhibited by Sir Jeremiah Colman, Bart., Gatton Park, Surrey.

Miltonia × 'Limelight.' A.M. May 16, 1939. The spike bore three large deep-rose flowers, the petals and labellum having the greater part rich crimson. The result of crossing *M.* × *Armstrongiae* with *M.* × 'Lycaena.' Exhibited by Messrs. Armstrong & Brown.

Narcissus 'Justice.' A.M. April 20, 1939, as a variety for exhibition. A shapely, well-proportioned, creamy-white giant Leedsii variety (Division 4a) with flowers 4¾ inches in diameter, borne on 14-inch stems. The perianth segments were smooth and overlapping, the outer ones being 2 inches long and just over 1½ inch broad. The corona was 1¾ inch long and 1 13/16 inch in diameter at its reflexed margin. Raised and shown by Mr. Guy L. Wilson.

Narcissus 'Samite.' A.M. May 2, 1939, as a variety for exhibition. A well-formed white Trumpet variety (Division 1b) with flowers of rather variable proportions, about 4½ inches in diameter, borne on stout 18-inch stems. The white segments were smooth, broad and overlapping, the outer ones being about 1⅞ inch long and about 1⅝ inch broad. The creamy white, rather cylindrical corona was about

1⅝ inch in diameter at its reflexed margin, and its length was usually just equal to that of the perianth segments, but in about one-third of the flowers the corona was slightly shorter than the length of the segments. Raised and shown by Mr. Guy L. Wilson.

Odontioda × 'Marie Antionette' var. 'Milo.' A.M. May 16, 1939. A charming hybrid obtained by crossing *Odontioda* × 'Colinge' with *Odontoglossom* × 'President Poincare.' The spike bore fourteen flowers of excellent shape, rose-tinted with scarlet-red markings. Exhibited by Messrs. Charlesworth, Haywards Heath.

Odontioda × 'Pierette.' A.M. May 16, 1939. The spike bore seven rose flowers, effectively blotched with claret-red. The result of crossing *Odontioda* × *Joiceyi* with *Odontoglossum* × *Jamesianum*. Exhibited by Messrs. McBean.

Odontoglossum × 'Brimstone Butterfly' var. 'Gold Wings.' A.M. May 16, 1939. The spike bore nine bright golden-yellow flowers, the sepals and petals entirely unspotted. The result of crossing *O.* × *Armstrongiae* with *O. crispum*. Exhibited by Messrs. Armstrong & Brown.

Odontonia × 'Catana' var. 'The Spinney.' A.M. May 16, 1939. The spike bore eight flowers, white with a large reddish-purple blotch on each of the petals. The result of crossing *Odontoglossum* × *eximium* with *Odontonia* × 'Bleuardent.' Exhibited by F. E. Griggs, Esq., Chislehurst.

Odontonia × 'Ida.' A.M. May 16, 1939. The erect spike bore five flowers, the segments flatly displayed and profusely spotted with scarlet-red. The result of crossing *Miltonia* × *Charlesworthii* with *Odontoglossum* × 'Minotaur.' Exhibited by F. E. Griggs, Esq.

Oncidioda × 'Stuart Low.' A.M. May 16, 1939. A very distinct hybrid obtained by crossing *Oncidioda* × *Cooksoniae* with *Oncidium macranthum*. The twining spike bore six flowers, the sepals reddish crimson, the petals of similar colour in the basal half, orange coloured in the apical portion. Exhibited by Messrs. Stuart Low, Jarvis Brook.

Pyrus Malus 'Laxton's Red.' A.M. May 2, 1939. From Messrs. Laxton Bros., Bedford. A desirable late-flowering Crab raised by the exhibitors from a cross between *Malus Niedzwetzkyana* and *M. Scheideckeri*. It is very floriferous and bears semi-double, narrow-petalled flowers of a greyed shade of Tyrian-rose (H. C. C. 24) in clusters of eight or more.

Rhododendron × 'Blue Diamond.' F.C.C. May 2, 1939. Shown by J. J. Crosfield, Esq., Embley Park, Romsey, Hants, as a hardy flowering shrub for general garden use. A hybrid between *R. Augustinii* ♂ × *R.* × 'Intrifast' ♀, which received **A.M.** when exhibited by Mr. Crosfield in 1935 (JOURNAL R.H.S., **60**, p. 321). The plant before the Committee on this occasion was of a deeper and better blue than that originally certificated.

Rhododendron Bureavii. A.M. May 16, 1939. Sent by Lionel de Rothschild, Esq., Exbury, Southampton, as a hardy flowering shrub

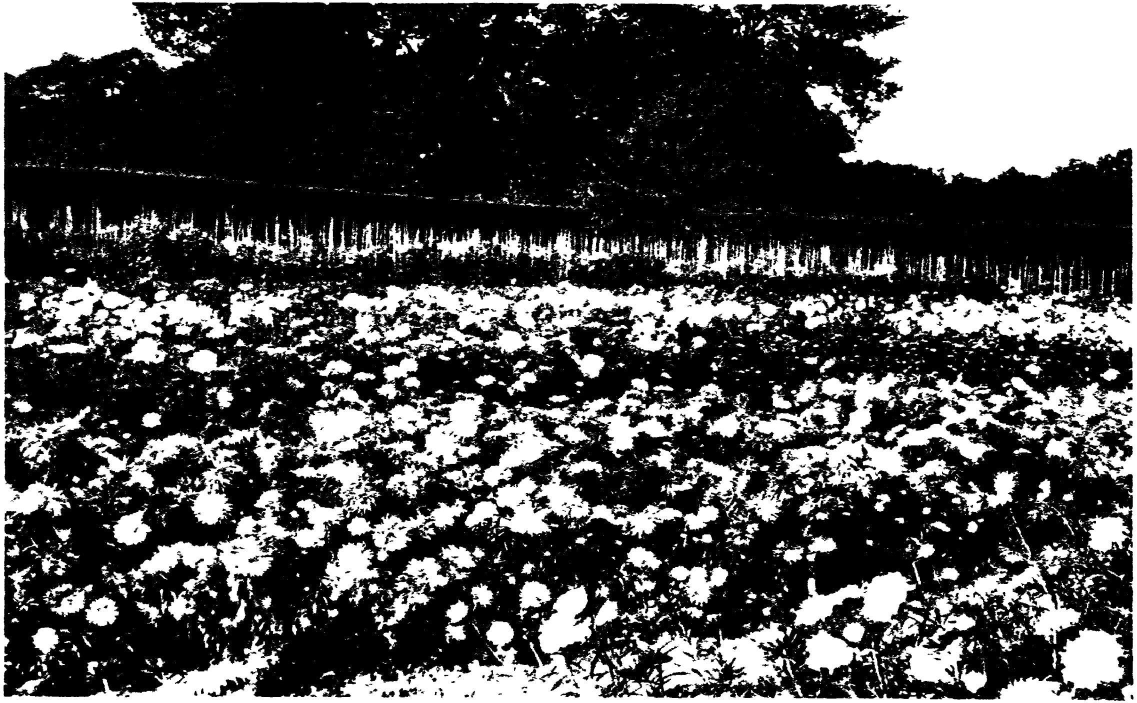

FIG. 77. TRIAL OF CHINA ASTERS AT WISLEY, 1938
(See p. 195.)

To face p. 332

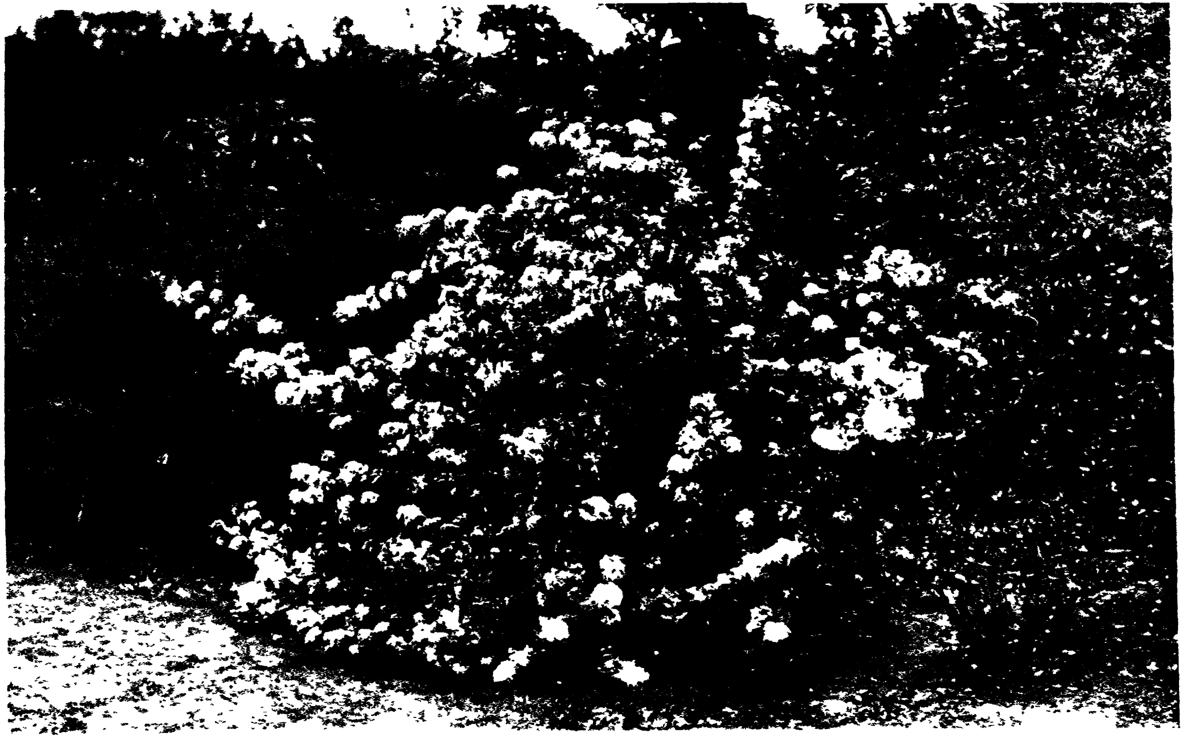

FIG. 78.—OLEARIA MYRSINOIDES AT WISLEY, 1938

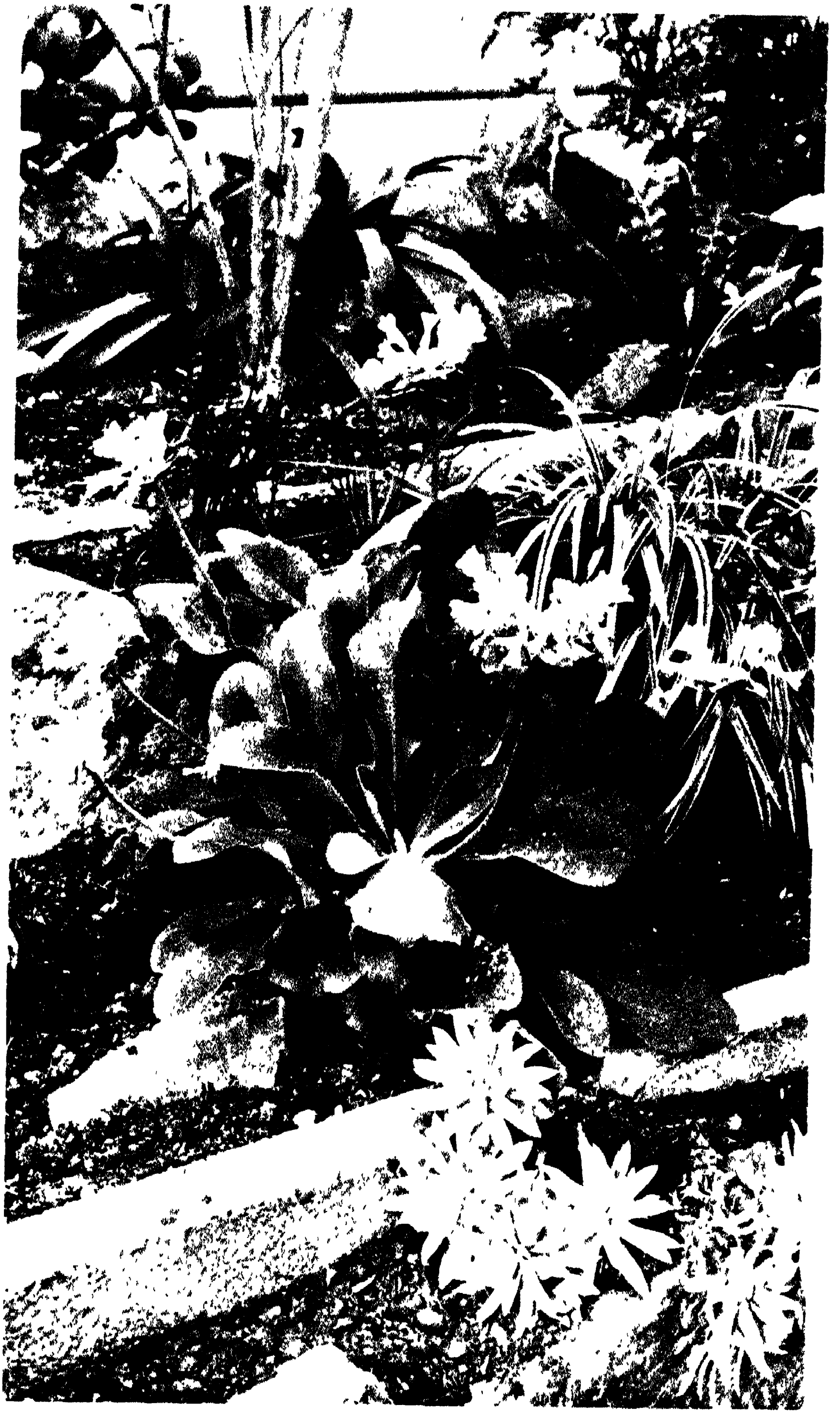

FIG. 79 PRIMULA PALINURI AT WISLEY, 1930

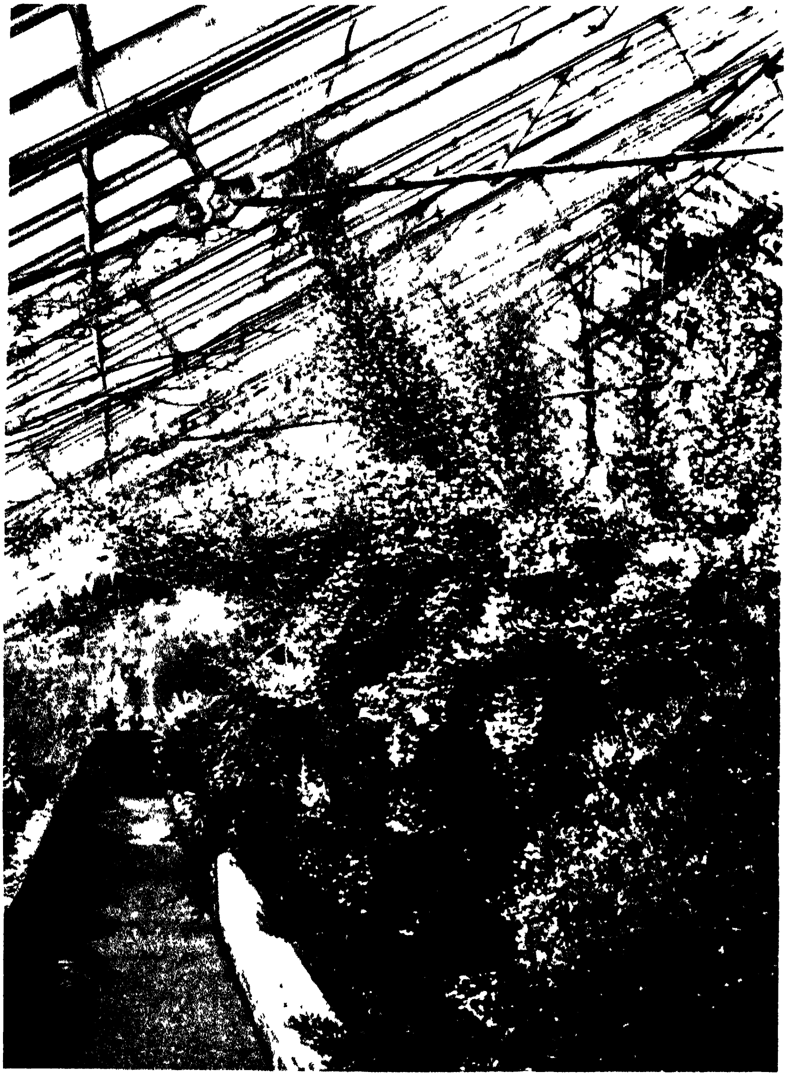

FIG. 80. ERICA CANALICULATA AT WISLEY
March 1939

[To face p. 333

for the woodland garden. The rather flat trusses up to 5 inches wide bear about ten funnel-shaped flowers, up to 2½ inches wide by 2 inches deep, five to seven lobed, at first flushed rose, later fading to white, crimson spotted within. The ovate-lanceolate thick leaves are shiny above and covered below with a thick felty cinnamon indumentum which also covers the young shoots.

Rhododendron caeruleum. A.M. May 16, 1939. Shown by Lionel de Rothschild, Esq., as a hardy flowering plant for the woodland garden. The flowers, borne in great profusion, are small, wide open, white, but reddish on the top of the tube without and prettily speckled red within. The small obovate leaves are scaly below and shiny above.

This plant was raised from Rock's seed number 59207.

Rhododendron × 'David.' F.C.C. May 16, 1939. A *R.* × 'Hugo Koster' hybrid sent by the Rt. Hon. Lord Swaythling, Townhill Park, Southampton, as a hardy flowering shrub for general garden use, with compact spherical trusses of many deep blood-red flowers, slightly spotted on the upper side of the tube within, funnel-shaped; stamens white, included; style as long as the corolla, white. The ovate-lanceolate acute leaves are up to 4½ inches long by 1⅝ inch wide, glabrous on both surfaces.

Rhododendron × 'Elisabeth.' A.M. May 2, 1939. A hybrid between *R. Griersonianum* × *R. repens*, shown by Lord Aberconway, Bodnant, N. Wales, as a hardy flowering plant for general garden use. The truss shown bore five clear deep red flowers, widely campanulate with spreading lobes, about 3 inches across. The leaves are small, up to 2 inches long by ⅞ inch wide, ovate, acute, dull green above, with a thin fawn tomentum beneath.

Rhododendron × 'Goblin.' A.M. May 16, 1939. The progeny of *R.* × 'Break of Day' × *R. Griersonianum*, shown by Lionel de Rothschild, Esq., as a hardy flowering shrub for the woodland garden. Loose trusses of about seven widely funnel-shaped flowers up to 3 inches wide by 2 inches deep, pale salmon-rose; the calyx very large, irregularly lobed, some lobes over 1 inch long, somewhat streaked. The ovate-lanceolate leaves are acute and glabrous.

Rhododendron × 'Louise.' A.M. May 16, 1939. An Azalea produced by crossing *R. Kaempferi* with *R.* 'Dark Red Indian,' and exhibited by Lionel de Rothschild, Esq., as a hardy flowering shrub for the woodland garden. The flowers, usually in twos or threes, are widely funnel-shaped with spreading lobes, about 2½ inches wide, salmon-scarlet with red exserted stamens and style; calyx about ½ inch long, green, pubescent, ciliate, deeply lobed. The small ciliate leaves are slightly pubescent on both surfaces.

Rhododendron × 'Naomi' var. 'Stella Maris.' F.C.C. May 16, 1939. Sent by Lionel de Rothschild, Esq., as a hardy flowering plant for the woodland garden. Another result of crossing *R.* × 'Aurora' and *R. Fortunei*, differing from *R.* × 'Naomi' (**A.M.** 1933), and *R.* × 'Naomi' var. 'Nautilus' (**A.M.** 1938), in its slightly larger flowers, fuller trusses, and larger leaves. The flowers also seem to open wider.

Rhododendron × 'Rosefinch.' A.M. May 16, 1939. A cross between *R.* × 'Bella' and *R. Griersonianum*, shown by Lord Aberconway, Bodnant, N. Wales, as a hardy flowering shrub for general garden use. The loose rather flat trusses bear up to ten flowers, about 3½ inches wide by 2½ inches deep, rather long-tubed with spreading lobes, deep rose with a slightly bluish tinge, a little paler within; calyx red, about ½ inch long, irregularly lobed. The lanceolate leaves are up to 7 inches long by 2¼ inches wide.

Rhododendron × 'Touchstone.' F.C.C. May 16, 1939. Sent by J. J. Crosfield, Esq., Embley Park, Romsey, Hants, as a hardy flowering shrub for general garden use. A *R. Griffithianum* hybrid which has improved in quality since it received an **A.M.** at Chelsea in 1937. See the JOURNAL, R.H.S., Vol. **62,** p. 374.

Rhododendron × 'Zuyder Zee' var. 'Jersey Cream.' A.M. May 16, 1939. A hybrid between *R. campylocarpum* and *R.* × 'Mrs. Lindsay Smith,' sent by J. J. Crosfield, Esq., as a hardy flowering shrub for general garden use. The compact spherical trusses contain about twenty funnel-shaped cream flowers up to 3½ inches wide. The obtuse, elliptic leaves, slightly cordate at the base, are up to 4 inches long by 2½ inches wide, glabrous.

Rose 'The Doctor.' A.M. May 16, 1939. From Messrs. Laxton Bros. Bedford Ltd., Bedford. A fully double H.T. variety raised by Messrs. Howard & Smith, California, U.S.A. The very fragrant, bright rose-madder flowers are large and of perfect form.

Saponaria ocymoides rubra compacta. A.M. May 16, 1939. From Mrs. Gwendolyn Anley, Woking, and Orchard Neville Nurseries, Baltonsborough. An unusually good, compact form with freely branched downy growths bearing small spathulate leaves and very numerous rounded flowers ½ inch wide of rhodamine purple (H.C.C. 29/1).

SMALL EXHIBITS.

Edgeworthia papyrifera is said to be hardy only in favoured localities, but Mr. E. D. DONCASTER, of Byways, Burley, showed on April 4, 1939, several well-flowered sprays together with a fine photograph of the plant itself growing outside, where it has attained 4 feet in height and 6½ feet in width. The rather lax, spreading habit of the bush is well illustrated, as is the abundance of terminal heads of yellowish-white downy flowers borne on the as yet leafless branches.

According to BEAN this plant, a native of China, was introduced into England in 1845, but has long been cultivated in Japan for the making of good class paper used for currency. The twigs are extremely supple.

Phillyrea decora, a hardy evergreen bush, was also sent by Mr. DONCASTER. It bears dense axillary clusters of sweetly scented greenish-white flowers, which are succeeded by purplish-black berry-like fruits.

Discovered in 1866 in Lazistan (on the S.E. coast of the Black Sea), and introduced into France in that year, it was not flowered in England till 1883, when it did so at Knap Hill.

A fine plant deserving more popularity.

THE most striking plant amongst those on the Small Exhibits Table on May 2, 1939, was a magnificent specimen of *Viburnum macrocephalum,* exhibited by Mr. SCRASE-DICKINS, of Coolhurst, Sussex, to show, as he said, what a good plant it is for pot culture. If we can all be sure of being as successful as Mr. SCRASE-DICKINS in its cultivation, it is indeed a useful plant for this purpose, for the plant shown bore no fewer than fifty-two great white balls of flowers.

This deciduous shrub was sent to the Royal Horticultural Society's Gardens by FORTUNE in 1844. He had found it in Chusan and Shanghai, and observed, " This noble species was also found in the gardens of the rich in the North of China, and will probably prove perfectly hardy in England." He had seen a tree of it at least 20 feet high. (See JOURNAL R.H.S., **J. 2** (1847), p. 245.)

As early as 1846 it was said that " Even in the greenhouse, and in a pot, its beauty is conspicuous." In England, unfortunately, it has proved not altogether hardy, but it can be grown in sheltered positions or on walls, or, as Mr. SCRASE-DICKINS demonstrates so clearly, in a pot to perfection.

The species received an Award of Merit when shown by Mr. LIONEL DE ROTHSCHILD in 1927, and is illustrated in the JOURNAL R.H.S., **63,** 209.

Another beautiful plant shown was the Japanese Cherry 'Fugenzo,' one of the loveliest Cherries in cultivation. Although now fairly well known in England, it was brought here less than fifty years ago—comparatively recently, when one considers that it has been known in Japan for more than five hundred years.

Prunus 'Fugenzo' makes a small tree up to 18 feet in height. The large, double rose-pink flowers generally open about the beginning of May, intermingling with the young coppery foliage, which turns green on reaching maturity. It is described by Mr. COLLINGWOOD INGRAM in the JOURNAL R.H.S., **50**, 83, and is considered by him to be amongst the twelve best Japanese Cherries.

Sent by Miss E. ARMSTRONG, Dadnor, Ross.

Two rare Arisaemas were also shown: *Arisaema sikokiana*, which received an **A.M.** in 1938 (see JOURNAL R.H.S., **63**, 374), and an unidentified species wrongly designated *A. serratum*. Both these plants are new to cultivation in Great Britain, and interesting; the former with its deep purple spathe, greenish streaked and long bladed, and its white thickly capitate spadix; the latter with its green spathe, rather longer tubed and shorter hooded, and its thin spadix. They were both sent by G. ROLAND OFFER, Esq., Shirley, Surrey.

BOOK REVIEWS.

" Spore Discharge in Land Plants." By C. T. Ingold. 8vo. vii + 178 pp. Ill. (Clarendon Press, Oxford, 1939.) 7*s*. 6*d* net.

The majority of plants are fixed for life to one spot, but since they, like animals, produce offspring in numbers potentially much greater than is necessary merely to replace the parents there have to be devices for dispersal. In the seed-bearing plants the mechanisms for dispersal of pollen-grains (microspores) and seeds (with or without fruit-structures) are well known and there are good general accounts available. In the ' lower plants ' which reproduce by spores (sexual or asexual) dispersal is equally necessary for survival of the species. A great many interesting and important data are known regarding spore discharge, which must precede dispersal over wider areas. Dr Ingold has brought together in a very attractive and convenient book some of the best studied examples of such spore discharge in cryptogams growing on land.

The work is heartily recommended to all students and teachers of biology. The excellent fount, the convenient format, and the clear illustrations make it a pleasure to read, and the style is unambiguous and concise. The facts are given in eleven chapters, arranged, after a historical introduction, according to the mechanism involved in the discharge of the spores. Actually this treatment very closely coincides with a taxonomic arrangement. There is a useful bibliography and an index

Naturally the fungi group occupy more space than any other group, indeed than all other groups together. This is partly because of the diversity of their spore-discharge mechanisms, and partly because this aspect of their life-histories has been intensively studied, particularly by Prof. A. H R. Buller and his pupils.

Water-squirting mechanisms are described in detail for *Pilobolus*, *Empusa*, and *Basidiobolus*, and for a considerable number of Ascomycetes. Discharge due to rounding-off of turgid cells is exemplified by *Conidiobolus* and other Entomophthorales, *Sclerospora*, and aecidiospore discharge in rust fungi The drop-excretion mechanism of basidiospore discharge and the catapult mechanism of *Sphaerobolus* each form the subject of a chapter. Mechanisms released by the rupture of water held under tension include spore discharge from the sporangia of certain Vascular Cryptogams and Liverworts. The air-gun of *Sphagnum* is simple and somewhat unique. Hygroscopic mechanisms are particularly well seen in some Liverworts and in the peristome-protected capsules of many Mosses, while ***Frullania***, a Liverwort, has a peculiar spiral-spring mechanism for spore discharge.

The final chapter, which might with advantage have been extended in length, deals with certain generalities of the discharge and dispersal of air-borne asexual spores of Cryptogams. The great wastage of spores is emphasized, a formula for distance of discharge is worked out, and the general life-history of coprophilous species is briefly indicated.

W. B. TURRILL.

" Violets for Garden and Market." By G. L. Zambra. 8vo. 70 pp. Col. ill. (Collingridge, London [1938].) 3*s*. 6*d*.

Not only are there clear directions in this book on the way to grow violets but there are recipes for their use in various ways as, e.g., Violet Syrup, Candied Violets, and there are good descriptions of the varieties with notes on their idiosyncrasies.

One complaint we have to make It is advised to syringe with nicotine and water when the plants are attacked by greenflies. One has to dissolve two ounces of soap in a gallon of boiling water . . . stir well, add the nicotine and apply when cold. Well and good, but why not say what kind of soap and how much nicotine ? The part dealing with insect and fungus attacks on the plants is indeed the least satisfactory part of the book.

" Gardens and Gardening, 1939." Ed. by F. A. Mercer. 8vo 128 pp Ill. (Studio, London, 1939.) 10*s*. 6*d*.

The main theme of this annual publication is the illustration of garden design, and many of the illustrations are from gardens abroad. Several short articles deal with "Progress in Garden Design," and a final one is entitled "Some Unusual Vegetables."

"Gardening on Nothing a Year." By Mary S. Griffith. 8vo. xi + 163 pp. Ill. (Drummond, London, 1939.) 5*s*.

This is one of a new series of books about gardens and gardening called the "Small Garden Series." It tells in a chatty fashion about a garden of two acres and the plants cultivated in it and gives many hints and directions likely to be helpful to those who wish to make and maintain a small garden economically and mainly by their own labour. A chapter on shrubs is added by Mr. Patrick Synge.

The book is well produced with good clear type and excellent illustrations.

"The Cultivation of Succulents." By H. Jacobsen. Trans. by Mrs. V. Higgins. 8vo. 106 pp. Ill. (Williams and Norgate, 1939.) 5*s*.

The cultivation of succulent plants has made considerable strides in this country of late years and is likely to increase. This little book, so comprehensive, so clearly written, and so admirably translated, will assist the spread of this type of gardening. It does not deal with Cacti, but with those plants with fleshy leaves and stems that belong to other families, such as Crassulas, Mesembryanthemums, Stapelias and Succulent Euphorbias

"Die Freilandprimeln." By L. Jelitts. 8vo. 92 pp. Ill (Ulmer, Stuttgart, [1938].) Limp covers. R.M. 2 50

This little book on hardy Primulas contains an account of the distribution of many members of the genus, notes on their cultivation, and brief descriptions of the species, arranged in the sections into which the genus may be divided. Most of this will be familiar to readers of our Journal from the many papers that have appeared from time to time. A new feature, however, is the indication given as to the species that may be likely to be found in nurserymen's catalogues, and those that are in botanical gardens for the most part. For instance, *Primula Moorsheadiana* is said to be "selten in botan. Gä.," *P. serratifolia* in botan. Gä.", *P. Busiana* "in Handel." This indication may save much trouble to those seeking to increase their collections of these plants. There are a number of illustrations from photographs of the species described. The book is, of course, in German.

"The Small Alpine Garden." Part II. By H. P. Leschallas. 8vo. 33 pp. Ill. (Rush & Warwick, Bedford, 1939.) Limp covers, 3*s*. 3*d*.

The first pamphlet under this name was published in 1937 and is noticed in JOURNAL R.H.S., **62**, p. 375. This part advocates the use of one kind of compost for all alpine and rock plants and records the author's experiences with it. The statements made seem to be supported by too little evidence to justify universal acceptance of the recommendations, and the text is full of errors which could easily be avoided.

"Wild Flowers of Australia." By T. Y. Harris. 8vo. xix + 198 pp. Col. ill (Angus & Robertson, London and Sydney, 1939.) 8*s*. 6*d*.

Two hundred and thiry-two Australian wild plants—some of them familiar to us in gardens—are figured in colour and described in short popular notes. These descriptions are followed by an epitome of the families represented and short botanical descriptions of the same plants arranged in their families and genera in botanical sequence. The book should make the recognition of many of the native wild plants met with in Australia easy, and drive the finder to seek for further information in larger and more complete floras.

"Some Beneficial Insects." Bull. 20. M. of Agriculture. By W. R. Thompson. 8vo. 26 pp. Col. ill. (H.M. Stationery Office, London, 1939.) Paper covers, 9*d*.

This brief but excellent and reliable account deals with insects that should be cherished. The few instances in which parasitic insects like Encarsia, the parasite of the white fly, have been successfully used are also recorded, and an account of experiences with others is given.

The coloured figures of Ichneumon, Braconid, Chalcid and Tachnid flies, Ladybirds, Hover flies and Lace-wing flies in their several stages should make their identification easy.

"Diseases of Fruit and Hops." By H. Wormald. 8vo. 290 pp. Ill. (Crosby, Lockwood, 1939.) 17*s.* 6*d.*

This is a companion book to The Pests of Fruit and Hops, and like that excellent book is a masterly review of the subject with which it deals. The early chapters deal with conditions affecting health and disease, and with fungicides and spraying. The need for cleanliness in the orchard is stressed. The third chapter deals with diseases like brown rot and silver leaf which attack a number of different kinds of trees, then those which are restricted in their attack to special kinds of fruits come in for attention.

The descriptions of symptoms, of predisposing causes and of control measures are clearly written without the use of obscure technical terms, yet without verbiage. Where known, susceptible varieties are indicated, and finally references are appended to each section giving titles and places of publication of important contributions to knowledge of the matter summarized.

The diseases are arranged for each fruit under those attacking the root, the stems and branches, the young shoots and foliage, the leaves, the flower buds and flowers, and the fruit itself, the diseases of the apple fruit filling one whole chapter.

Most of the troubles found from time to time are described but we find no reference to lithiasis in pears or to the type of "running off" of black currants so often associated with the nettle head disease of these bushes.

The illustrations are clear and adequate and indeed the whole "get up" of the book is excellent. We have no hesitation in recommending it to growers whether in commercial orchards or in private gardens.

"Make Yourself a Gardener." By R. Sudell 8vo 234 pp. Ill. (English Universities Press, London, 1939) 2*s*

This might have been called "How to make a Garden," and there is much good advice to that end. The beginner will find it useful but it is a pity that so many plant names are wrongly printed. Producers of gardening books would, we feel sure, find the Index to the R.H.S. Journal recently published, helpful in the direction of getting plant names right, if for nothing else.

Some statements are too sweeping, as where, on p. 99, the author says, "Sussex sandstone crumbles after frost." This is true of some sandstones found in Sussex but by no means of all, as any visiting Wisley may see, for the rock walls near the entrance are all of Sussex sandstone which has been exposed to many and severe frosts.

"Gardening Heresies and Devotions." By W. B. Honey. 8vo. 278 pp. Ill (Faber & Faber, London, [1939].) 10*s.* 6*d*

This book about gardening and some garden plants is divided into a good many short essays arranged under the twelve months—why so placed is not always obvious. Thus the essay on Potatos comes under February. In it we find repeated many of the errors which have surrounded the history of the Potato for so long, but which recent investigations (apparently not known to the author) have largely corrected. Gourds come under April, Apples more appropriately under September.

There is we fear all through a constant looseness of thought, although many of the essays are interesting. We read for instance (p. 238) in the essay on Japanese Chrysanthemums that "their" (the Japanese) "double-blossomed cherries and their chrysanthemums above all were the creations of artists"—but no man yet "created" a flower, they may have selected from among the variations which Nature gave, or which were induced by some action of man. The author goes on to say, "Thus, the alteration, by doubling or otherwise, of the natural form of a flower is not necessarily a loss. Only when it is done idly or wantonly for the sake of mere novelty is it to be condemned out of hand." Again we must say that doubling of flowers is not deliberately done by man—in spite of the old recipes for achieving this end, he cannot do it.

On p. 64 we read, "The onion shows relatively few distinct varieties." This is really far from the fact, as the perusal of any good catalogue even of our own country would show, and this would not include many types grown abroad quite unsuitable for our climate or requirements.

In spite of such failings many will find these diverse essays entertaining, and they may even find why the book was given its curious title, the precise implications of which have evaded us.

NOTES AND ABSTRACTS.

Astragalus and Oxytropis, Revision of Chinese species of [Revision der chinesischen Astragalus- und Oxytropis-Arten]. By E. Peter-Stibal (*Acta Horti Gotoburg.*, xii, pp. 21–85; illust.; 1938).—The authoress distinguishes ninety-five species of Astragalus and twenty-seven of Oxytropis as native to China and gives keys for their recognition as well as details of their synonymy and distribution.—*W. T. S.*

Calluna vulgaris, A review of the known forms of [Übersicht der bis jetzt bekannten Formen von *Calluna vulgaris* (L.) Hull]. By Willem Beijerinck (*Rec. Trav. bot. néerland*, vol. xxxiv, pp. 445–470; 1937).—Forms of *Calluna vulgaris*, the common heather, diverge in habit and hairiness and in the shape, size, number and colour of their leaves, flowers and flower-parts. Plants of as many forms as possible have been assembled at the Nederlandsch Biologisch Station of Wijster (Drente), Holland, for detailed study, and their constancy is being tested under cultivation. This paper is based on these plants, herbarium specimens and the literature. Two varieties, forty-eight forms and thirty-nine sub-forms are described in German or Latin and given names (*grandiflora, parviflora, elegantissima, stricta, pauciflora, campanulata, microphylla, decumbens, patula, erecta, condensata, nana, minima, rigida, praecox, autumnalis, hiemalis, alba, atroviolacea, purpurea, argentea, variegata, aurea, cuprea, incana, gynodioeca, clistanthes, brachysepala*, etc.). Many are from British gardens. The author has illustrated several in a previous paper ("Polymorphism and colour of the Calluna flower" in *Proc. Kon. Akad. Wetensch. Amsterdam*, 38, 1087–1095; 1935) and in *Pflanzenareale*, **4**, H. 6 (1938) has outlined the distribution of the species as a whole. Calluna extends over the greater part of Europe (except the south-east) and into north-west Africa; isolated populations grow in Iceland, the Azores, the east Balkan Peninsula and north-east Asia Minor. It is naturalized but not native in eastern North America.—*W. T. S.*

Sorbus, A Synopsis of the North American Species of. By George N. Jones (*Journ. Arnold Arbor.*, **20**, 1–43; Jan. 1939; figs.).—This study is based on specimens from eight herbaria in the U.S.A. or Canada of which citations are quoted.

All the North American species of this involved genus belong to the section Aucuparia, ten species native to the continent being recognized, and one variety, *S. decora groenlandica*, occurring in south Greenland as well as in Labrador. The bigeneric hybrids *Amelasorbus* × *Jackii* and several species of *Sorbaronia* are included under their Sorbus parent.

On the eastern side of North America occur *S. americana*, *S. decora* (having larger flowers and fruits, the leaflets acute instead of acuminate as in the former), and the naturalized *S. Aucuparia* which now stretches from Labrador to Pennsylvania, west to Washington and south-western British Columbia. In the western half of the continent *S. scopulina* has the greatest range, from British Columbia southwards as far as New Mexico, east to South Dakota. The remaining seven, of which two (*S. cascadensis* and *S. alaskana*) are newly recognized, occur in more limited areas, the little-known *S. dumosa* only in Arizona and New Mexico, *S. alaskana* confined to Alaska, whilst *S. sambucifolia* is only found in the western Aleutian Islands as an outlier from its normal habitat in north-eastern Asia.

The key for identification of the species is based chiefly on the winter pubescence of the buds, and the number, size, shape, and serration of the leaflets. Subsidiary characters are found in the flowers, pubescence of their pedicels, and in the fruits and seeds. *S. sambucifolia* is separated from all the others by its fewer and larger flowers and fruits, as well as by its place of origin.

The confusion between such species as *S. americana* and *S. decora*, *S. scopulina* and *S. sambucifolia*, *S. sitchensis* and *S. occidentalis*, has now, we may hope, been finally resolved; a number of misused names are consequently relegated to synonymy, although few are entirely dropped.—*B. O. M.*

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FORTHCOMING EVENTS.

SEVERAL changes on the staff of the Society which immediately concern Fellows and Associates will be taking place shortly.

The Society, in collaboration with the Oxford Press, is arranging to republish the famous Nicholson's Dictionary of Gardening, to be called The Royal Horticultural Society's Dictionary of Gardening. Mr. F. J. Chittenden has been appointed its Editor, and as such from October 1 he will give up the posts of Technical Adviser, Keeper of the Library, and Editor of the Society's publications, to devote his time to this new work.

In his place Mr. E. A. Bunyard has been appointed as Keeper of the Library and Editor of the Society's publications, and he will take over these duties from October 1.

The arrangements for Fellows and Associates to obtain technical advice, etc., that they may require will carry on as now until October 1, and before that date, in the September JOURNAL, full particulars will be given as to the new arrangements which are necessitated by the above change.

It will come as a matter of great regret to many Fellows, especially those who made use of his services, that Mr. Vine, who was the Society's Garden Inspector, is retiring.

The Society, however, is fortunate in being able to appoint Mr. James Wilson, recently the Head Gardener to the late Sir Philip Sassoon, at Trent Park, in his place.

The arrangements for Garden Inspection will continue as heretofore.

GREAT AUTUMN FLOWER SHOW.

The Great Autumn Flower Show is being held at Earls Court this year on September 13, 14 and 15. Next in importance to the Spring Show at Chelsea, this Great Autumn Show affords a wonderful opportunity for gathering together all the beautiful flowers and plants which make autumn brilliant with their colours, and Fellows are recommended to make a special effort to visit this Show, not only to enjoy the spectacle, but also to consider the matter of restocking their gardens during the coming planting season.

Particulars of the hours of admission to the Show are given below :

Wednesday,	September 13,	11 A.M.–9.30 P.M.
Thursday,	September 14,	10 A.M.–9.30 P.M.
Friday,	September 15,	10 A.M.–5 P.M.

The prices of admission for non-Fellows are :

Wednesday,	September 13,	11 A.M. to 2 P.M.	10s. 0d.
		2 P.M. to 6 P.M.	5s. 0d.
		6 P.M. to 9.30 P.M.	2s. 6d.
Thursday,	September 14,	10 A.M. to 6 P.M.	2s. 6d.
		6 P M. to 9.30 P.M.	1s. 0d.
Friday,	September 15,	10 A.M. to 5 P.M.	1s. 0d.

Two Challenge Cups will be competed for at the Autumn Show : the Coronation Cup, which is offered for the best exhibit at the Show, and the Wigan Cup, which is offered for the best exhibit of Roses. There will also be a Flower Arrangement Competition, particulars of which have been published.

The Schedule of the Autumn Show may be had on application to the Secretary.

BATH CHAIRS.

The Fellows are particularly asked to remember that, under the regulations of the London County Council, no invalid or wheel chairs of any kind can be admitted to this Show.

CALENDAR.

The particulars of the first Fortnightly Show of August, held on August 1 and 2, were given in the July number of the JOURNAL.

At the Fortnightly Show on August 15 (12 noon–7.30 P.M.) and 16 (10 A.M.–5 P.M.) there will be a competition for the Foremarke Challenge Cup, which is offered for twenty spikes of named Gladioli in not fewer than ten varieties and not more than two spikes of any one variety. This competition is open to trade and amateur growers.

There will also be a competition for Gladioli, the classes for which are as follows :

Class A.—6 varieties of large-flowered Gladioli, 1 spike of each. Other things being equal, preference will be given to the exhibit with the largest number of open flowers.

Class B.—6 varieties of large-flowered Gladioli, 1 spike of each. Other things being equal, preference will be given to the exhibit with the largest individual flowers.

In each of these classes the prizes will be :

First Prize, Silver Flower Bowl, presented by Mrs. H. W. Hall; Second, £1 ; Third, 10s.

Class C.—6 varieties of Primulinus Gladioli, 1 spike of each.
First Prize, £1 10s. ; Second, £1 ; Third, 10s.

Entries for these two competitions must be made on special forms obtainable from the Secretary, to whom the completed forms must be returned not later than by the first post on Wednesday, August 9.

On August 23 and 24 (2–4 P.M.), weather permitting, there will be a demonstration at Wisley on the Vegetative Propagation of Plants. The Director of the Gardens will be glad to know of those desiring to attend this demonstration at an early date.

A Fortnightly Show will be held on August 29 (12 noon–7.30 P.M.) and 30 (10 A.M.–5 P.M.).

On the same dates the Alpine Garden Society will hold its Show in the Old Hall.

On September 5 (1–7.30 P.M.) and 6 (10 A.M.–5 P.M.) the National Dahlia Society will hold its Show in the New Hall.

At 3.30 P.M., in the Lecture Room on September 5, Dr. A. B. Stout, of the New York Botanical Garden, will lecture on "Daylilies : Old and New."

On September 13, 14 and 15 the Great Autumn Show will be held at Earls Court. See special notice on p. 342.

The National Chrysanthemum Society will hold its Early-flowering Chrysanthemum Show on September 19 (1–7.30 P.M.) and 20 (10 A.M.–5 P.M.).

A Fortnightly Show will be held on September 26 (12 noon–7.30 P.M.) and 27 (10 A.M.–5 P.M.), and on this occasion a silver trophy, provided from Mrs. Sherman Hoyt's Prize Fund, is offered for the best group of Cacti and/or Succulents staged by an amateur. This competition was to have been held on September 13 and 14, but owing to the Great Autumn Show it had to be postponed.

On September 26, at 3.30 P.M. in the Lecture Room, Mr. E. R. Janes will give a lecture on "Sweet Peas."

The talk on "Some Plants in the Show" will be given by Mrs. V. Higgins at 3.30 P.M. on September 27.

On September 29 (2.30–9 P.M.) and 30 (10 A.M.–6.30 P.M.) the London Gardens Society will hold its Show in the New Hall.

LECTURES.

As a result of the late decision to hold an Autumn Show certain changes in the calendar, as printed on the tickets and elsewhere, have had to be made, especially in respect to lectures.

The lecture on "The Modern Garden" by Mr. G. C. Taylor, which was to be given on September 12, has to be postponed owing to the Autumn Show, but Mr. Balls, who was to have lectured on "Plant Hunting in Mexico" on October 24, is unable to give his lecture as he will still be away on his expedition, and so Mr. Taylor has kindly consented to give his lecture on October 24.

It is very pleasing to announce that another lecture will be added to the calendar this year, for Dr. A. B. Stout, U.S.A., the great authority on Daylilies, will be over here and will give a long promised lecture on "Daylilies: Old and New." This lecture will be given on the first day of the National Dahlia Society's Show, September 5, at 3.30 P.M. It is understood it will be fully illustrated by drawings, paintings and lantern slides, and will form a very important communication on these interesting garden plants.

COMPETITION FOR CACTI AND SUCCULENTS.

It should be noticed that the Competition for Cacti and Succulents, which was to be held on September 12 and 13, will now be held on September 26 and 27, owing to the Autumn Show.

IMPERIAL FRUIT SHOW.

The Imperial Fruit Show is to be held in the Old and New Halls from November 13 to 18, and Fellows are cordially invited by the organizers to pay it a visit. Their membership tickets will admit them free. It will be open from 2.30 to 10 P.M. on Monday, November 13, and from 11 A.M. to 10 P.M. on the other days.

The Show is designed to demonstrate the range and quality of fruits produced in Great Britain, the Dominions and the Colonies. Great Britain, Canada, India, Australia, South Africa, Northern Ireland, the Colonial Empire Marketing Board and the Ministry of Agriculture will each stage exhibits. It was last held in London in 1926, since when there have been important developments in production and marketing.

RHODODENDRON CONFERENCE.

The Rhododendron Conference, which the Society is holding in conjunction with the Rhododendron Association, will take place in 1940 on May 7, 8 and 9, and arrangements for the programme are progressing satisfactorily. The programme will include such subjects as: Rhododendrons in the wild; Survey, geographical distribution, and the story of discovery of Rhododendrons; Modern Rhododendron Hybrids and their uses in the Garden; Propagation; Greenhouse Rhododendrons; Hardy hybrid Rhododendrons, their cultivation in country and town; and Rhododendron species in a cold situation.

Concurrently with the Conference there will be a three-day Rhododendron Show with competitive classes. Visits to gardens will also be arranged.

Fuller details of the programme will be published from time to time in these notes, but Fellows interested in Rhododendrons are asked to notify the Secretary so that their names may be registered.

THE SEVENTH INTERNATIONAL CONGRESS OF GENETICS.

The Seventh International Congress of Genetics will be held in Edinburgh, Scotland, from August 23 to 30, 1939, and Fellows who are interested in this subject, and desire to take part in the Congress, are invited to apply to the General Secretary, Professor F. A. E. Crew, F.R.S., Institute of Animal Genetics, West Mains Road, Edinburgh, 9, Scotland.

COLORADO BEETLE.

The Minister of Agriculture asks that notice may be drawn to the Colorado Beetle.

The situation on the Continent in 1938 was more serious than in any previous year. The Colorado Beetle is now known to exist not only in Germany, Switzerland and Luxemburg, but migratory flights from France have taken place over Belgium and reached Holland, and given favourable weather the direct invasion of this country is possible.

The Ministry of Agriculture is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes or any red or reddish-yellow grub that is found feeding upon potato leaves should be regarded with suspicion. When suspected Colorado Beetles or grubs are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of potato leaf, and the box should be sent to the Ministry of Agriculture, 10 Whitehall Place, London, S.W. 1, with a letter stating the exact place where the insects were caught and the name and address of the finder.

THE SOCIETY'S EXAMINATIONS.

Teachers' Preliminary Examination in School and Cottage Gardening, held on March 18, 1939.

Three hundred and fifty-nine candidates entered for this Examination, and of these

80 were placed in Class 1.
112 „ „ „ „ 2.
70 „ „ „ „ 3.
60 candidates failed.
37 were absent.

359

A Silver-gilt Medal is awarded to Mr. David Phillipps, of New Street, Bugle, St. Austell, Cornwall, who was First.

Teachers' Advanced Examination in School and Cottage Gardening, held on June 7–9, 1939.

Forty-seven candidates entered for this Examination, and of these

31 passed.
13 failed.
3 were absent.
—
47
—

National Diploma in Horticulture, Preliminary Examination, held on June 12–16, 1939.

One hundred and thirty-one candidates entered for this Examination, and of these

44 passed.
80 failed.
7 were absent.
—
131
—

National Diploma in Horticulture, Final, Section 1 *(General Horticulture), held on June* 20–23, 1939.

Forty-four candidates entered for this Examination, and of these

13 passed.
29 failed.
2 were absent.
—
44
—

Final, Section 2 *(Hardy Fruit Growing), held on June* 20–21, 1939.

One candidate entered for this section and passed.

Final, Section 6 *(Gardening in Public Parks), held on June* 26–27, 1939.

Four candidates entered for this Examination, and of these

2 passed.
2 failed.
—
4
—

Final, Section 8 *(Horticultural Teaching), held on June* 21, 1939.

One candidate entered for this section and passed.

The following have been awarded the National Diploma in Horticulture:

Section 1—General Horticulture.

Archer, Kenneth.
Clarke, Frank.
Cornwell, Phyllis Hine.
Hepworth, Rodger.
Lockie, George Donaldson.
McElroy, Leonard Frederick.
Maitland, Thomas Rae.
Monroe, Jessie Margaret.
Moore, Lucy Margaret.
Nourish, William Henry.
Plant, William.
Rose, Peter Quickfall.
Smith, Alexander Wood.

Section 2—Hardy Fruit Growing.

Hamboullas, Kyriakos.

Section 6—Gardening in Public Parks.

Craig, John.
Fanner, F. H. J.

Section 8—Horticultural Teaching.

Powell, Aubrey G. C.

Hall Lettings.

(Fellows' tickets do *not* admit.)

A Model Engineering Exhibition will be held in the Society's Old Hall from September 8–18, particulars obtainable from Messrs. Percival Marshall & Co., Ltd., The Model Engineer, 13–16 Fisher Street, W.C. 1.

The National Rose Society will be holding its Show in the New Hall on September 22 and 23. For further particulars apply to the Secretary of the National Rose Society, Courtney Page, Esq., 117 Victoria Street, S.W. 1.

Wisley in August.

The principal floral trials or collections which have come into bloom since last month's list was published are the Dahlias, China Asters, Montbretias, the earliest border Chrysanthemums, and the greater number of the Gladioli, while the Godetias and *Scabiosa caucasica* varieties continue their season. The Dahlias are planted on both sides of the broad grass path with stretches from the Rose Walk towards Battleston Hill, while the other trials will be found in the neighbouring enclosures. Opposite to the Pear Orchard, on the way to the Alpine house, is the border composed of annual flowers, a very gay and popular feature which shows the variety of colour, height and habit obtainable from these useful flowers.

Beside the Alpine house an excellent shrub which produces sprays of bright blue flowers at this season is the hybrid *Caryopteris* × *clandonensis*, and in the bed facing it are several varieties and forms of

Gazanias, particularly suited to dry and sunny positions and having an exceptionally long season of bloom. In the house itself a number of interesting plants are still to be seen, notably species of Campanula, including *Campanula Piperi*, *C. cashmiriana* and *C. malacitana*, the white *Gentiana saxosa* from New Zealand, Wahlenbergias, closely allied to the Campanulas, and the dainty pink *Limonium ornatum*. The Rock Garden, however, has much more to show, and two of the best-represented genera are the Gentians and Cyananthus. Of the former, *Gentiana Loderi*, *G. gracilipes*, and the lovely hybrid 'Devonhall' raised by Mr. HARLEY are examples, whilst of the latter there are *Cyananthus lobatus insignis*, *C. integer*, and *C. Sherriffii*. Other choice or decorative plants now flowering are *Anagallis collina* from Morocco, *Eritrichium strictum*, in blue and silver, *Pentstemon campanulatus*, the 'Balloon Flower' *Platycodon grandiflorum Mariesii*, the low-growing yellow *Ruta patavina*, Yuccas on the meadow, and *Zauschneria californica*, another sun-loving plant invaluable for dry walls. These by no means exhaust the list, but are merely a sample of what may be expected at this time of the year.

The latest Lilies in the Wild Garden are *Lilium superbum* and *L. Sargentiae*, the former being particularly luxurious in damp places, where the Swiss *Gentiana asclepiadea* is also to be seen in quantity, and the pink Astilbes likewise prefer the shade. An outstanding shrub is *Hydrangea paniculata grandiflora*, with immense creamy-white heads of blossom, and beneath some of the conifers the first of the autumnal *Cyclamen neapolitanum* push up white or rosy buds.

The bushy Californian *Aesculus parviflora*, with spikes of white flowers, is one of the few large shrubs flowering in August in Seven Acres, together with *Buddleia Davidi* and its hybrids, but the Water-lilies in the pond continue to throw up fresh red, pink, or white blooms, and at the water-side is the blue Pickerel-Weed, *Pontederia cordata*, with ornamental, spear-shaped leaves. The Heath Garden forms many bright patches of colour, with the tall and fragrant *Genista aethnensis* dominating various Heaths of the *Erica cinerea* and *E. vagans* groups, the Corsican *E. terminalis* which grows 3 or 4 feet high and has groups of rosy-pink bells, the various forms of Ling (*Calluna vulgaris*) such as *Alportii*, *Serlei* and *Hammondii*, and the purple or white Connemara Heath, *Daboecia polifolia*.

The return towards the glasshouses and Laboratory may be made either along the herbaceous border, where the large assortment of carefully grouped and suitable plants will now be at their height of colour and effect, or by the round pond through the Award of Merit Garden. Here are large beds in full flower of the red *Helenium* 'Moerheim Beauty,' 'Black-Eyed Susan' (*Rudbeckia speciosa*), *Monarda didyma* 'Cambridge Scarlet,' and *Erica vagans* 'St. Keverne,' clear pink in colour and dwarf in habit. Other good plants are the grey-leaved *Perowskia atriplicifolia* with spikes of lavender flowers, *Fuchsia Riccartonii*, and the blue South African *Agapanthus africanus Mooreanus*, all combining to make this section of the garden attractive.

Completing the tour with the glasshouses, we find in the large Temperate house the pale blue *Plumbago capensis*, various sorts of Fuchsias, the fragrant white clusters of Stephanotis, and the huge Potato-like flowers of *Solanum Wendlandii*. In the Half-hardy house the shrubby yellow-flowered *Pentstemon antirrhinoides* is a notable inhabitant from California, the South African Nerines and their improved hybrids are in bloom, with *Oxalis Bowiei* and the crimson *Pelargonium Schottii* from the same country, whilst *Asteriscus maritimus* with a profusion of rich yellow Daisy-flowers is a European native from the Mediterranean shores.

Some decorative shrubs for this season are to be seen on the several walls of the Laboratory, especially *Abelia grandiflora*, the Pomegranate (*Punica Granatum*) and *Rosa bracteata* on the west, and the light-blue *Ceanothus azureus* on the east side where it passed unharmed through the last severe winter.

THE LINDLEY LIBRARY.

By F. J. CHITTENDEN, F.L.S., V.M.H.

THE Horticultural Society of London between its foundation in 1804 and 1859 formed a large Library which was housed in its commodious quarters in Regent Street. In 1859 its financial affairs had reached a parlous state and retrenchments were imperative. The house in Regent Street had to be given up and smaller premises found, and this involved parting with the Library which was sold by Messrs. Sotheby on May 2, 1859, and succeeding days. The Council expressed great reluctance in parting with the Library, although it was apparently regarded with more pride of possession than as an instrument of value, for scarcely twenty persons made use of it in a year. The money received from the sale was, however, of considerable use in tiding over a difficult time.

When quarters were secured at South Kensington, Fellows urged the need for a new library and the Council recognized that need, for in June 1862 it accepted the gift from Mrs. ROUPELL of her work, Specimens of the Flora of South Africa, and that was the first book to be placed in the Library now housed in the offices of the Royal Horticultural Society. The Library grew by gifts, bequests and purchases. In June 1865 Mr. STRACHAN presented a considerable number of books which were welcomed as a great addition to " the infant library " and at the same meeting the announcement was made of the bequest of books from the library of Sir JOSEPH PAXTON who had recently died.

The great impetus to the acquirement of a library came, however, in the following year when Professor JOHN LINDLEY'S library was submitted for sale and was acquired for the sum of £600. Although the Society advanced the money for the purchase this sum did not fall to be found out of its funds, for when the affairs of the International Botanical and Horticultural Conference of 1866 came to be wound up the Committee found themselves with a balance of £2,383. Of this £1,000 was given to the Gardeners' Royal Benevolent Institution and the rest was devoted to the acquisition and maintenance of a library. A trust was established on May 5, 1868, and the Trustees consisted of three members nominated by the Committee of the Conference, three by the Council of the Royal Horticultural Society and a Chairman elected by these nominated members. The first chairman of the Trustees of the Lindley Library was Sir CHARLES WENTWORTH DILKE. The Trustees offered to acquire the Lindley collection and to give the Society the care and use of it and such other books as might from time to time be acquired provided the collection was open to all horticulturists and students. To this the Council agreed, and by 1867 the

Lindley Library and the books belonging to the Society itself were housed side by side in the Council Room at South Kensington. The arrangements were announced publicly and gifts of books were invited. The first recorded response to this invitation was the gift of a book to the value of twenty-five guineas from Her Majesty Queen Victoria.

From that time the Library grew by presentations, by purchases made by the Trustees and by the Society, and a new impetus was given when the Society removed from South Kensington to 117, Victoria Street in 1887, and when in 1899 the first catalogue was published about 4,000 volumes had been gathered together and it was thought to be the finest horticultural library in the United Kingdom.

Another move took place in 1904, the year of the Society's centenary, this time into a room specially prepared for it on the second floor of the Hall in Vincent Square which had been furnished for the purpose at the expense of Baron Sir HENRY SCHRÖDER. It soon outgrew the accommodation then thought ample, as did indeed all the activities of the Society, and after the New Hall had been built in 1924 improved provision was found for the Library by the building of a third floor to the Hall in Vincent Square, the whole of which was devoted to the purposes of the Library, and towards the expenses of this the Carnegie Trustees gave £1,200 for furnishing the "stack room."

At first the books in the care of the Royal Horticultural Society, though forming one library open to all equally, were partly the property of the Society, partly of the Trustees. In 1910 a scheme was prepared by which the whole was placed under one body of Trustees consisting of the Council of the Royal Horticultural Society. The Society on its part handed over to the new Trust all the books in its possession and the Trustees under the first Trust handed over the books and also the funds which they had administered since 1866, the amount of the fund now being £1,509.

Thus all the books in the Library are now held by the Council of the Royal Horticultural Society in trust for the benefit of horticulturists and none can be sold or otherwise disposed of save duplicates, the sale of which is permitted provided the proceeds are used in the purchase of other books.

The income from the invested fund s far too small to maintain the Library and its services, let alone to enable it to be kept up to date, and a considerable sum is annually expended by the Society to that end and a conservative estimate of the value of the Library at the present time is £25,000.

An idea of the growth of the Library can be gained by the growth of the Catalogue. The Catalogue of 1898 occupied 162 pages. Another edition was pubished in 1926 and that occupied 488 pages. Since that edition was published, supplements consisting of about 330 pages of the same size have been published.

This great growth, the result of many gifts, purchases and exchanges of the Society's publications for publications abroad, has placed the Lindley Library as probably the most complete horticultural library in the world. The recent great bequest of books from the collection made by the late REGINALD CORY has not only enriched it by the addition of many scarce and valuable books hitherto lacking, as a glance at recently published acquisition lists will show, but it has also enabled it to extend the facilities it had for many years offered to horticulturists.

Fellows have been able to obtain on loan direct from the Library under the regulations published in the first part of the current volume of the JOURNAL many books and students have had a like privilege of borrowing through the National Central Library. This great accession has made it possible to add loan copies of some uncommon books which hitherto the Library had been unable to lend, and to arrange for the loan of some other exceedingly rare and valuable books, too precious to allow outside a library, to libraries where they may be available for consultation under the supervision of the librarian, and which hitherto could have been consulted only by visitors to the Library.

In addition to these there were several books in the bequest, duplicates of those already in the Library, and surplus to the Library's requirements, which have been sold, and the money realized will be expended upon other especially valuable books as they become available, for the Library is of course not yet complete in all the great horticultural books of the past, although so many are represented there.

The feature of the Cory bequest was the books with illustrations of plants, especially coloured illustrations, over which so much care was taken in the latter half of the eighteenth and the early part of the nineteenth centuries. Many of these are very rare and some of the copies contained in the bequest were unique. A few brought back to the care of the Trustees, volumes which had been in the Horticultural Society's Library before its dispersal in 1889, and the books of illustrations of plants worthy of a place in the gardens of the world now in the Library form a collection which can be consulted with pleasure and profit by all who seek to know something of the riches of the world's flora and of the knowledge gleaned since plants began to be studied.

PELARGONIUMS.

By Sir ARTHUR W. HILL, K.C.M.G., F.R.S., V.M.H.

[Read June 20, 1939, Prof. F. E. WEISS, F.R.S, in the Chair.]

As you know, we always talk about Pelargoniums as "Geraniums," so in the first instance it will be as well if I show you what is the difference between a Pelargonium and a Geranium. Geraniums have perfectly regular five-petalled flowers and there is no nectary, but the flower of a Pelargonium is irregular or zygomorphic, with two petals above and three below and a nectary adnate to the flower stalk for almost its whole length (fig. 81). The horticulturist has so masked the structure of the flower by selecting and breeding plants to produce large rounded petals that those who cultivate the garden "Geranium" are not aware that the flower is irregular or that a nectary is present. I hope, therefore, that as a result of this talk you will look at your plants and you will notice that there is a nectary running along the top of the flower stalk, and by cutting the stalk across you will be able to see the hole, the tube of the nectary, on the top of the flower stalk. Although the horticulturist has now so rounded the cultivated Pelargonium flower that it appears to be a regular one, if you look carefully at a flower it will be seen that the two upper petals are slightly distinct from the three lower ones. They have certain lines and markings on them which are not present on the three lower ones. The genus Geranium is not of so much interest from the floral morphology point of view as is the larger genus, Pelargonium, so I need say no more about it.

When you examine the numerous species of Pelargonium you find various colour and other interesting modifications in the flower. A typical Pelargonium flower, such as that of *Pelargonium zonale*, has narrow, somewhat spatulate petals, the two upper ones being slightly marked with lines. In a number of species the two upper petals have become much larger and more conspicuous, very often they are of a different colour, and the three lower ones in these species are quite small and tend to come together to make a sort of keel, and you can see that both the stamens and style curve upwards at their tips. This leads to further interesting modification resulting in a pea type of flower due to the changes in the position and size of the petals. In these pea-flowered species the three lower petals are grouped together to form a definite keel, which encloses the stamens and style; when a visiting insect alights on the keel, the pollen is shot out as in the flower of a Cytisus and other papilionaceous flowers.

P. rapaceum (fig. 82) is one of the species in which the pea-shape type of flower has been developed. The main difference between this Pelargonium and the pea flower is that instead of one petal forming the standard, as in the Pea, two petals turn up to form a "standard" in Pelargonium, and whereas the keel in the pea flower consists of two petals, it is made up of three petals in Pelargonium.

Other interesting modifications are shown by *P. Grenvilliae*, where two of the petals are large and form a conspicuous standard ; by *P. papilionaceum*, with the two upper petals well developed and the three tiny lower ones scarcely visible ; and by *P. Endlicherianum*, where the three lower petals are also reduced to negligible proportions, while the two upper ones are quite large.

One other interesting type of flower is shown by *P. Bowkeri* (fig. 83) and *P. schizopetalum*, both of which have fimbriated petals. There are only two or three species with these deeply cut petals and no intermediates appear to exist between the species with entire and those with fimbriated petals.

Until the year 1787 only a few species of Pelargonium were known in cultivation, and when they were first introduced from South Africa they were placed in the genus Geranium ; that, no doubt, is the reason why at the present day our garden or zonal Pelargoniums are incorrectly called Geraniums.

In 1787 L'HÉRITIER, the French botanist, founded the genus Pelargonium and described the differences between it and the genus Geranium. Later some other genera were founded which included several of the bulbous species, but they are now all included under Pelargonium. There are some 250 species of Pelargonium known, and over 200 of these come from South Africa. There are a few species in Tropical and North Africa and in the Orient, four in Australia and one in New Zealand.

A great number of these Pelargoniums and hybrids used to be in cultivation, and now only a very few places—chiefly Botanic Gardens like Kew and Edinburgh—still possess a collection of species, and even at Kew and Edinburgh only a small number remains of those which used to be grown and which were figured by SWEET and in botanical magazines. They are not all easy to grow, but they are well worthy of cultivation both from their floral beauty and from their many points of botanical interest.

Pelargoniums are also of considerable interest from the point of view of their leaves, and you find a remarkable play on form when you study the leaves of the different species. The typical leaf of the zonal Pelargoniums, such as *P. inquinans* and *P. zonale*, is reniform in outline, *P. zonale* showing the zonal band on the leaf. *P. cordatum* has a heart-shaped leaf. Then you will find there is a great deal of difference in the leaf edges which may be entire, dentate or serrate, while some are deeply lobed at the base, but they are all based on a palmate type of leaf.

The "Regal" species have usually a very sharply serrate edge to the leaf ; and the leaves of some species resemble those of the beech or birch; while the ivy-leaved Pelargonium has an entire-edged five-lobed peltate leaf and in *P. ternatum* the palmate leaf is cut to the base into five lobes.

Then there are numerous species with a much more complicated type of leaf, many of which are highly scented, as, for instance, *P. ficifolium*, *P. radula*, *P. quercifolium*—but all these leaves are the result of cutting up a peltate leaf into five or more segments; following on from these there is a tendency to approach a pinnate form by prolonging the central lobe with lateral lobes on each side of it.

Then you pass into a series of extraordinary forms which are not in the least suggestive of the genus Pelargonium, as, for instance, *P. carnosum*, *P. Zeyheri*, and *P. alternans*, which has a regular pinnate leaf, as have also *P. rapaceum* (fig. 82) and *P. triste.* The last two are rather like carrot leaves, and certainly not the least like the leaves of the ordinary garden Pelargonium with which we are more familiar. It is of interest when one looks through the list of species of Pelargonium to see the various names which botanists have given to these different forms, because you find names like *asarifolium*, *aconitifolium*, *corydalifolium*, *crithmifolium*, *myrrhifolium*, *oxalidifolium* (fig. 84)—all suggestive of the different forms of leaf that may be found in the genus.

The earliest Pelargonium introduced to this country from the Cape, a little over three hundred years ago, was *P. triste.* This was introduced in the year 1632, and you will find it figured in SWEET'S Geraniaceae under the name *P. filipendulifolium.* It is also recorded in JOHNSON'S Gerard under the name of *P. indicum.* It was brought over in 1632 by JOHN TRADESCANT, and he flowered it in his garden in the July of that year. I am glad to say we still have *P. triste* in cultivation at Kew.

The next species to be introduced to this country was *P. cucullatum*, which is a species of particular interest because it is the dominant parent of all the "Regal" types of Pelargonium which are so beautiful, and which unfortunately have so much gone out of cultivation at the present day.

Apparently the Dutch were the first to bring over Pelargoniums from South Africa, and I think it is very likely that there were two or three species being grown in Holland some time before they were brought over to England—that is before the year 1632.

The second one to be introduced to England was *P. cucullatum* in 1690, and HERMAN in the Chronicle of the Leyden Botanical Garden, published in 1687, mentions that this species was in cultivation there.

By 1703 a good number more were being grown, and COMMELIN, in writing about them, recognized the variability of the leaf form, for he wrote: "Ita species ejus sunt vel Aquilegiae, Ibisci, Alchemillae, Coriandri, Staphyis-Agriae, Myrrhidis, Astragali et sic porro foliis"; so that evidently we had in cultivation at that time in England quite a representative number of species showing the various types of leaf.

Important dates in the history of Pelargonium cross-breeding were the year 1710, when *P. zonale* was introduced, and 1714, the year of the introduction of *P. inquinans*, for these are the two parents of the bedding or zonal Pelargoniums. As a result of hybridizing and selecting from this cross I venture to think the horticulturists have spoilt a very beautiful flower! Compare the modern bedding types, for instance, with *P. inquinans*, with its rounded scarlet flowers, and *P. zonale*, with its pink narrow petals, and our early hybrid *P. kewense*. I hope you will agree with me that they possess a charm and beauty which the apparently regular and large rounded flowers quite lack—another case in which æsthetic beauty has been sacrificed for size and colour! *P. zonale* was introduced in 1710 by the Duchess of BEAUFORT and *P. inquinans* in 1714 by Bishop COMPTON.

Coming to the year 1723 we find that Dr. JAMES SHERRARD, who had his garden at Eltham, was growing several species of Pelargonium there, and MILLER in the Second Edition of his Dictionary gives twenty species.

In 1812, 102 species and hybrids had been described, and in the year 1820, when SWEET published his five-volume work on the Geraniaceae, 500 species and hybrids were described and figured.

Messrs. COLVILLE & SONS were great growers of Pelargoniums in this country, and raised a large number of hybrids. Many species were also in cultivation in the Apothecaries' gardens in Chelsea in SWEET'S time.

The other wild species of importance in the history of the cultivated Pelargonium are the parents of the "Regal" types. The three main parents were *P. cucullatum*, which was introduced in 1690 from the Cape; *P. angulosum*, 1724; and *P. grandiflorum*, 1794. It is unfortunate when one is trying to trace the history of the cultivated Pelargonium that there is no definite record of the various crosses that may have been made. It is quite clear that several other species than the three mentioned had been used, so it must be largely a matter of conjecture, but the rich colours of the fine hybrid "Regal" types must have been derived from other species than the three parents mentioned since these all have rather dull mauve flowers.

A great deal of hybridizing took place in the nineteenth century. There was a Pelargonium craze, something like the Tulip one, and many people were attempting to produce new forms. Their methods, with which I do not fully agree, are well set out in the following quotation from an article in the Gardeners' Chronicle of October 2, 1841:

" There are few flowers that better repay the attention they receive than the Pelargonium. Its lively appearance, its delicate and brilliant colour, the fragrance of its foliage in many cases, the profusion of its beautiful flowers, and its easy cultivation, render it deservedly a favourite with all classes, down to the cottager who grows it in his humble window. The great improvements that have been achieved within a few years in the properties of this flower, and the splendid varieties we now possess, bear triumphant evidence of the advantages to be derived from judicious cross-fertilization. The long narrow, flimsy petals of the old varieties, moved by every breath of wind, and

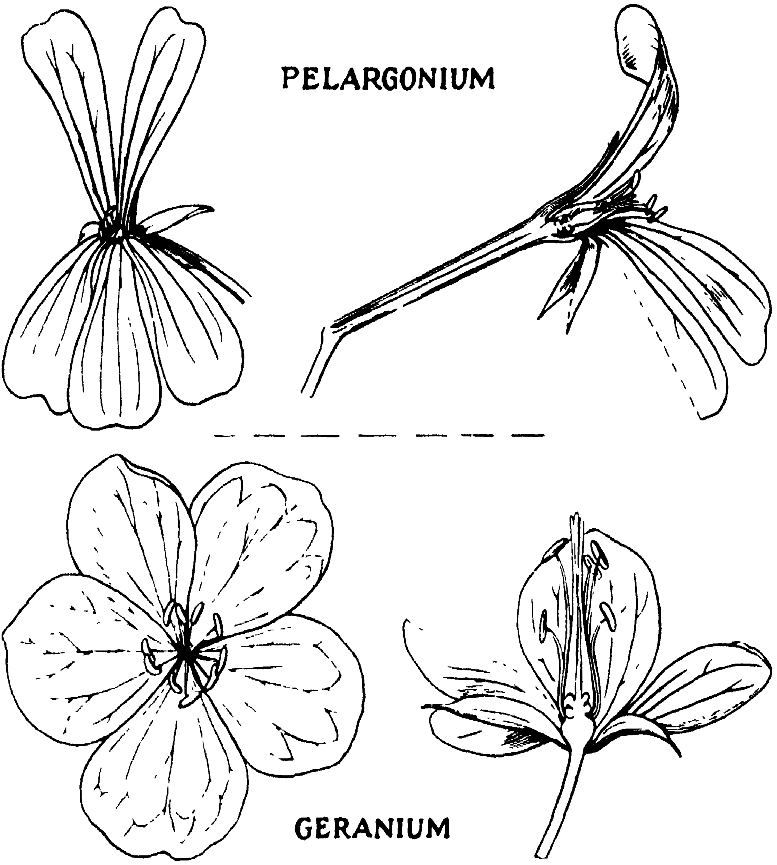

FIG. 81. FLOWERS OF PELARGONIUM AND GERANIUM IN FACE VIEW AND IN SECTION. THE PELARGONIUM FLOWER IS IRREGULAR WITH THREE PETALS BELOW AND TWO ABOVE, AND A NECTARY ADNATE TO THE FLOWER STALK ON THE UPPER SURFACE. THE GERANIUM FLOWER IS PERFECTLY REGULAR AND THERE IS NO NECTARY.

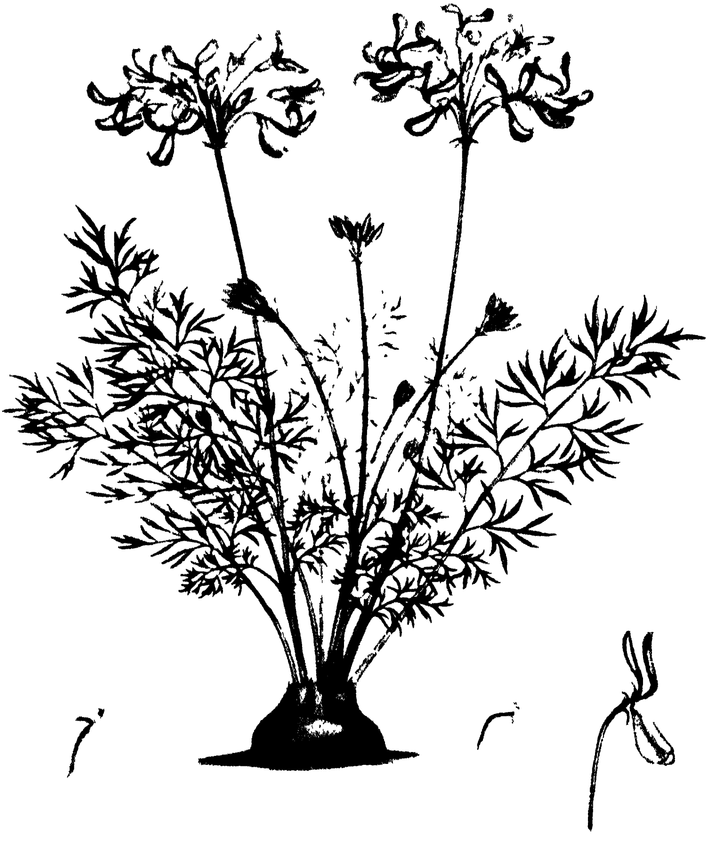

FIG. 82.—PELARGONIUM RAPACEUM WITH PEA-LIKE FLOWERS, THE TWO UPPER PETALS FORMING A STANDARD, THE THREE LOWER ONES CONNIVENT TO FORM A KEEL WHICH ENCLOSES THE STAMENS AND STYLES. THE DEEPLY-CUT, PINNATIFID LEAVES ARE ALSO CHARACTERISTIC.

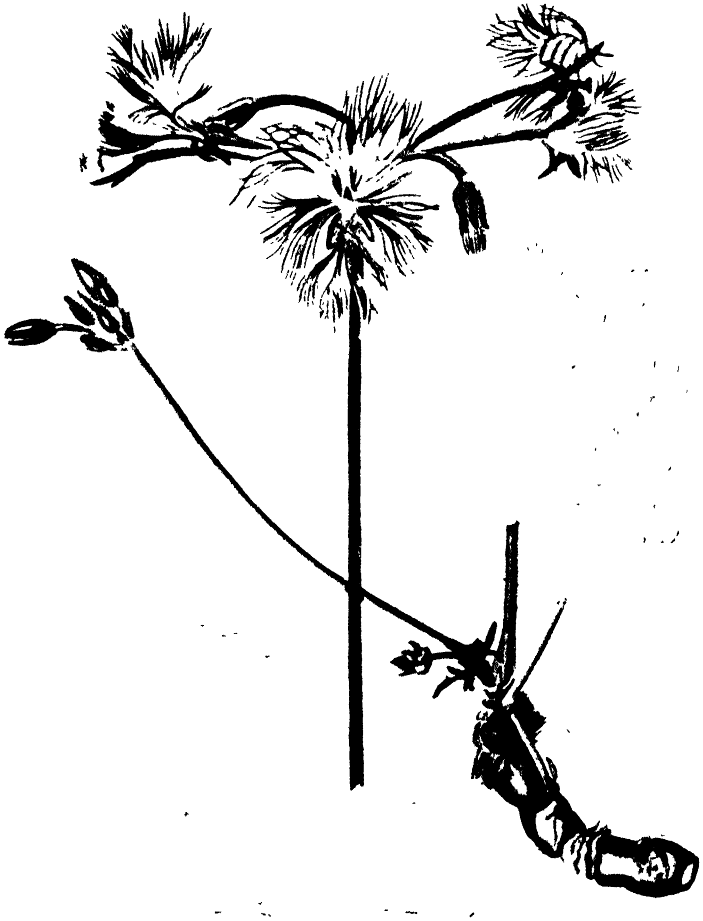

FIG. 83. PELARGONIUM BOWKERI WITH DEEPLY FIMBRIATED PETALS AND CARROT-LIKE PINNATE LEAVES

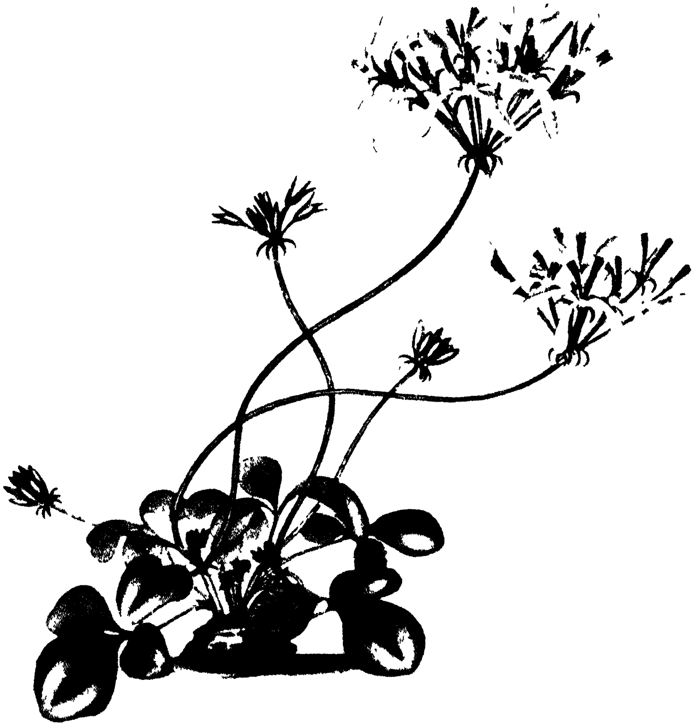

FIG. 84.—PELARGONIUM OXALIDIFOLIUM SHOWING THE TRIFOLIATE OXALIS-LIKE LEAVES AND THE TWO UPPER PETALS OF THE FLOWER STRONGLY MARKED WITH DARKER COLOURING.

[*To face p.* 357.

separated to their very base by broad open spaces, have been succeeded by the beautiful compact flowers of the present day, with broad stout petals so entirely overlaying each other as to leave scarcely an indentation in the outline of the flower; while the coarseness which prevailed in the larger of the old sorts is replaced by a firmer substance, and a far more delicate texture. For these improvements we are chiefly indebted to the zeal and perseverance of two amateurs—EDMUND FOSTER, Esq., and the Rev. Mr. GARTH—whose love of Floriculture has induced them to devote their time and attention to the delightful occupation of effecting such further improvement as this flower is still susceptible of. It is difficult to conceive to what extent these alterations will be carried, when we consider that in each succeeding season of late years we have witnessed the development of some latent beauty which we had before despaired of seeing."

As I said before, I am afraid I do not fully agree with the writer, because in the rounding off of the flowers I consider very much of their æsthetic beauty has been destroyed.

Another remarkable development in the genus is shown by the numerous tuberous species, and they are also interesting because not only do you find among them the papilionaceous type of flower, but also many peculiar types of leaves. Among them the following are worthy of note: *P. barbatum*, with a pointed leaf; *P. spatulatum*, with a leaf like a plantain; *P. astragalifolium*, with a leaf exactly like a vetch; *P. asarifolium*, with rounded leaves and with only two conspicuous petals forming a standard and the others almost vanished; *P. longifolium* and *P. ovalifolium*, also with plantain-like leaves. This species is of particular interest, since the earliest leaves are entire and the later ones become divided, and finally leaves like those of Fennel are produced. *P. oxalidifolium* (fig. 84) has leaves exactly like an Oxalis, but unfortunately it is not now in cultivation; and then there is *P. rapaceum* (fig. 82), with its pea flower, carrot-like foliage and tuberous stem.

In conclusion I must draw your attention to a few of the fleshy-stemmed species, the best known of which is the cactus-like *P. tetragonum* (fig. 85). For the greater part of the year the small palmate leaves are shed and there is only the jointed four-angled fleshy stem. The flowers also are peculiar, as there are only four petals, two very large upper petals and two very small lower ones, the median one of the three lower petals having vanished.

Another remarkable species is *P. crithmifolium*, with fleshy leaves rather like those of the samphire, and cactoid, much branched fleshy stems, leafless for most of the year, but bearing the spiny remains of the dried leaves and inflorescences. *P. dasycaule* is another very similar species of this type.

The last one I wish to bring to your notice of the fleshy types is *P. cotyledonis*, a native of the Island of St. Helena. It is one of the few native plants of the Island which escaped the ravages of the goats which were unfortunately introduced into St. Helena. It bears dark green palmate leaves and pure white flowers, but for the greater part of the year consists only of the swollen woody stems.

I have said nothing about scent, but many of the species are very pleasantly scented, such as *P. fragrans*, *P. odoratissimum*, *P. Radula* and *P. graveolens*. Geranium oil is an economic product used in the manufacture of scents, and some of the scented species are now being grown in Kenya Colony for scent production. In the South of France they have long been cultivated for this purpose.

Pelargoniums, therefore, have not only an æsthetic interest but are also of economic importance, and as I have attempted to show they are of considerable interest from the botanical point of view as well.

I think if a fossil botanist should find some leaves of the pinnatifid species of Pelargonium fossilized in some of the recent rocks he would be rather puzzled as to the genus to which they should be assigned.

TOWN WINDOW-BOX GARDENING.

By Mr. H. C. GREEN.

[Read May 2, 1939; Mr. C. H. CURTIS, F.L.S., V.M.H., in the Chair.]

WHEN asked to say something on Window-Box Gardening, I called to mind a piece of advice sometimes given to lecturers, " Do not start by telling people how to do a thing, tell them first how not to do it." However, if I were to begin to tell you the many ways of how not to begin filling window-boxes, there would be no time left for me to tell you how it should be done.

I will start first then with the most important part, that is the box. Many people think you should get an ordinary box, and that any box will do; you need only put a spot of mould in it and anything will grow. I want to try to impress upon you the fact that what I am going to say to you only refers to town window-boxes, and is quite apart from country window-box gardening. Dozens of flowers as you know will grow in the country that will not grow in London, and the object of this talk is to try to interest those who live in confined spaces in towns, where one has all the soot and petrol fumes, in having a little attractive garden in window-boxes during the summer and winter, at the same time remembering that the only way to do that is to have a succession of flowers periodically replaced in the boxes throughout the different months of the year.

It is quite impossible to get flowers to grow satisfactorily in London. I have during the last ten years had a considerable amount of experience in the planting of window-boxes, and I find if the plants are changed you can get a good show, whereas if you try to grow them on you will find it is definitely a failure.

With regard to the box; boxes can be made of various woods. You may have the ordinary deal boxes which are the commonest, or you may have pitch pine, or oak, or teak, the difference being that teak will last many years, whereas an ordinary deal box will not last more than two or three. But a deal box can be made to last longer if it is properly made in the first place, and receives the usual three coats of paint—an undercoating of lead paint and two coats of colour on the top, thus preserving the wood from the elements; good lasting value can be obtained by this process.

The inside of the box is best left bare. It is wiser to paint it about three-quarters of an inch down only to about the level where the soil will come; the remainder is best left unpainted, then you will not get the effects of the painting interfering with the soil and upsetting the plants.

If creosote is used, the box must be thoroughly dried after, otherwise its effects may be detrimental, especially if you are planting plants whose roots grow very rapidly; they will burn if they come in contact with it.

It is important that you should have a certain amount of depth and width (10″ × 9″) because obviously you cannot profitably crowd a large number of plants into a small box. By doing that you will not only get a bad effect, but the flowers will not thrive because they soon become congested. Of course the boxes may be of any length you like according to the length of your sill.

I would mention one point while I am talking about window-sills, that is, if you are having the box on the edge of a sill as some people have to, at a rather awkward angle, put a wedge underneath the box; it will enable the box to be brought up level. The idea is to bring it level so that it will not slip off the edge and become dangerous. It is always advisable if you can to have a couple of large screw eyes cemented into the wall in the corners (at each end) and to have a thick galvanized wire or screw put into the wall in order to prevent it from slipping, because dangerous accidents have occurred where a window-box high up looked perfectly safe from the inside, but a high wind sprang up, or somebody opened the window and gave it a jolt, and it fell on to someone in the street below and caused heavy damages.

So much for the box construction; the next point is drainage. There is quite an amount of controversy about drainage in the window-box. People say, " You must have drainage and holes in the bottom to let surplus water out and so forth," and other people say you need not have these. I am not going to advise you one way or the other, because it does not matter whether you do or do not have the holes. The whole point with these boxes is that the flowers which are placed in them are not going to remain there long enough to cause you to bother much about the actual drainage in the same way as you do when you grow a plant such as a Tomato or something like that, where you have to consider the drainage very carefully. It is as well when you are filling them to have some broken crocks at the bottom, perhaps a couple of inches, and then to fill up the box with a light sandy soil suitable for planting, which is not sticky to the fingers when planting as clay or heavy soil would be, and which will not become easily caked and crack during the summer.

Watering is another essential point in window-box gardening. You should not give plants too much. Many people are under the impression that you must soak the boxes with water. That is not essential. Pelargoniums (Scarlet Geraniums) especially do not need to have so much water as other plants. You should watch this very carefully, because you can easily over-water. Water so that the soil is just moist and not saturated. You will not then get water in the bottom of the box, and it will not become stagnant. If you water lightly and often rather than giving a lot and then forgetting all about the plants for two or three days, you will find it by far the more satisfactory method.

One other point I might mention. During the summer months after several fillings it is perhaps a good idea to add a little bone meal to the soil in order to give it a refresher. It is quite a reasonable article to buy, and it will help the soil considerably when you are planting in the later months of the year.

Now as regards the planting. I propose to take the four seasons of the year and at the same time give a succession of flowers without having actually to grow the plants.

Most people begin with a filling of bulbs; they are the most attractive things to have. Daffodils or Hyacinths obtainable in many colours will give an excellent show for a considerable number of weeks. You can of course, if you like, mix the bulbs, and place smaller bulbs as Crocuses or *Scilla sibirica*, or Muscaris, along the front edge. But if you plant Crocuses you will be considerably hampered by birds, because the sparrows are very fond of pecking out the centres, and almost invariably when you think you are going to get a nice little show of Crocuses, there will be nothing at all.

Following the spring filling of bulbs, which will take you probably up to the end of March, the next thing I would suggest is Cinerarias or Stocks. These are the best flowers that one could use at this time of the year. These flowers are grown by the nurserymen throughout the country for different periods of the month.

Many are under the impression that the moment you come into May you can start Geraniums. That is a great mistake. People start planting Geraniums far too early in the year; the time to plant Geraniums to get the best out of them is the third week in May, and not the first, because you may still get late frosts, and you will find the Geraniums which have opened in the glasshouse will have all their early buds nipped off, and will take several weeks to recover.

Between the seasons, following the Stocks, etc., which will probably last you four or five weeks, and take you into the second or third week in May, there can be an in-between filling of short Rhododendrons, which will give you an excellent show and last for three or four weeks coming into full flower before they are finished. Varieties such as 'Pink Pearl,' 'Doncaster,' 'Alice,' and several others can be obtained as fairly small plants with perhaps four or five buds and will be found very satisfactory, in boxes. These should be planted 18 inches apart so as to get the heads staggered, and faced so that you get a whole show along the front of the box. If you are planting them on a leads or on a balcony, then you can plant them facing both ways, so that you get the all-round effect when looking from the top.

Following the Rhododendrons, we come into the Geranium-planting season, which brings us to the last week in May or the beginning of June. There are many varieties of Geraniums and many ways of planting the boxes. Everyone seems to have a different idea as to how to plant them, as to the different colours to use together, but I want you to remember that in the West End of London or in a thickly populated area where you have a lot of petrol fumes many of the fancy varieties will not thrive. They flower for about a fortnight, and then take weeks before they throw up their next truss. I had a case only last year in the West End where we planted a lot of boxes with 'Paul Crampel,' and on one side of the building they made enormous growth and made a brilliant show; on the other side of the building they faded away and one could do nothing with them at all. It was just the situation of the building, the fumes from the traffic rose to about 15 feet, above the level of the windows of the shop, and absolutely nothing would do there, yet on the opposite side of the building they were perfect. It was a fact that they faced south, they were not affected by the wind which blew round the opposite corner and they flourished; on the other side, they were absolutely useless. That is one of the points to remember; if you should find that your boxes will not thrive where they are, it is much better to do without them, otherwise you will be wasting money, and none of us can afford to do that.

Marguerites will flourish in London but they need a lot of water; the 'Paul Crampel' Geranium is one of the best and showiest varieties you could possibly have. You could also use 'Denmark,' the salmon pink, or again, you could have other flowers in front of the 'Paul Crampel,' such as Ageratum and Heliotrope, which will do well in June.

In some places Ivy-leaved Geraniums such as 'Galilee' will thrive very much better than the zonals. Perhaps it is the locality. In the Hampstead district they grow extraordinarily well, and in south London they also grow very well, but nearer central London the zonal varieties perhaps are better.

I also introduce Fuchsias here. Fuchsias do remarkably well in London; you can have Fuchsias planted in the middle of town, and I have known where they have still been in flower in late October. It is surprising how they will grow and bud and you have a wonderful show right away until the leaves turn in the autumn.

Passing from the summer to the end of July and August, the boxes begin to become a little thin and it is advisable to have another filling before the winter sets in. I suggest you have a filling of an early Chrysanthemum which you can get in pots, or Celosias look well in window-boxes. It is a very difficult time because you get the late season when the Geraniums are practically spent and it is too early to introduce the shrubs, so that if you can get a filling of early Chrysanthemums, it is a good idea, because you will get probably four or five weeks' flowering out of them. There are several varieties which are obtainable from any florist in town or in the suburbs nowadays.

Passing from the autumn to the beginning of winter, you come to November, when of course flowers practically cease, especially when you are subject to fogs. I suggest you refill with some shrubs which are the best possible thing for London, the Aucuba and *Skimmia japonica*. The latter has bright red berries rather like holly, and they retain these berries all through from the beginning of November until May.

Another point with regard to winter fillings—always choose something with a large leaf, because you can sponge them at intervals during the winter and help them to retain that freshness so desirable during the months when the fog is about. Lots of people are inclined to use plants like Cupressus and those shrubs which may look attractive when they are purchased, but in a very few weeks they feel the effects of the fog and become very ragged and limp and look exceedingly untidy. You can do nothing with them. They have plenty of lasting value, but they do not retain their freshness ; for that reason I think it essential that you should have a shrub with a large leaf which can be sponged. It does not take much time to run over a box six feet long with a sponge, if you just put your hand underneath the leaves and sponge them over with a little lukewarm water and a little soft soap mixed with the water, that will wipe off all the fog deposits and leave the leaf fresh and green, and incidentally give it an absolutely new appearance that will last quite a considerable number of weeks.

One point arises with regard to bulbs which I should mention, that is that when you are planting bulbs, it is not essential to plant them in the spring. Some people prefer to plant them in November, in which case I would suggest that you plant the bulbs underneath the shrubs when the shrubs are planted. If you leave it till the spring, when you have to purchase the bulbs already started in the pots, by transplanting them into the boxes you are at least certain of getting a good flowering result from them. If you plant them in the autumn you must face the risk of a severe winter, when you stand a chance of losing them altogether through frost. I have had several cases this year where clients have had the boxes filled in the autumn and have come to me and said, " What has happened to our boxes, no bulbs have come up ? " I have just dug into the soil to see exactly what the trouble was, and we have found the whole box has become frozen right through and the whole of the bulbs were destroyed. That is a very unfortunate state of affairs for which nobody can be responsible, because the bulbs were perfectly good ones, but the trouble was the frost killed them. If you can wait for the early spring when you can buy them actually in the pots already beginning to grow, it is ninety-nine chances out of a hundred they will come exactly as you want them to and you will not lose them.

Daffodils are a little hardier than Hyacinths, they flower sometimes earlier or later according to the varieties you use, but usually Hyacinths are the most attractive for giving you the longest show throughout the spring against the Daffodil which to a certain extent flowers very quickly, finishes and becomes practically transparent in the course of about a week.

Another alternative for the winter filling is the small clipped box. I know I am contradicting myself when I suggest box, because of what I said about the ease with which large-leaved plants can be kept clean, but there are some people who are fond of box trees, and these little clipped box trees are very attractive in a window-box if you have them alternating, a small ball in the centre, a tall pyramid one on either side and a pyramid at each end ; this makes a very attractive filling and you can syringe them if they become very dirty, but you have that unfortunate trouble of soot on the box trees which will in time make them look very dusty and dirty. It is perhaps difficult to keep that film from becoming very thick in time ; about the end of the year or the beginning of January, one feels it is time they were taken out and changed, but at the same time they are not expensive.

I still maintain the best show you could possibly have for the winter filling is *Skimmia japonica* which maintains its berries for such a considerable period, and Aucuba which gives you the variegated leaves.

I think that is all I have to tell you about the actual filling part.

In planting the plants must be knocked out of the pots and planted in the ordinary way in the soil ; but one does not want to disturb the roots more than necessary, because if you do you will probably upset the plant and stop its growth for a week or two until it becomes re-established.

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In reply to questions Mr. GREEN said that it was unnecessary to change the soil more than once every other year. The plants placed in the box are actually grown in fresh soil, being only in the box a month or two, and have some of their own soil adhering to their roots.

Even in those boxes where bulbs were killed by frost you need not change the soil, but you must take the bulbs out. You must prick over the top, so that the air can get in, otherwise it becomes caked and the air will not get to the roots ; also give it some bone meal to assist it in recuperating.

Petunias do quite well in window-boxes, and in some places, the further out of town the better, so will Begonias. Petunias sometimes become very leggy, so you must get the dwarf varieties rather than the taller ones, otherwise you will have to stake them. The little pink dwarf Petunias do well. This is one of the newer varieties. There is also a very deep violet blue on the market now, which gives quite a good show.

Lobelias are quite good as well.

Wallflowers are not satisfactory in central London nor have I found Antirrhinums do well, though in more open spaces they are all right. Night-scented Stocks, if they can be kept from smothering other things, will do, so also will ' Golden Gleam ' Nasturtiums and some Violas, but I have never found Pansies satisfactory. Rock-plants I cannot recommend, for though some may grow and even flower, I do not regard them as suitable for window-boxes. Salvias are not very good in London. The winter-flowering Heaths also do not make much show in boxes.

* * * * *

The CHAIRMAN said he would like to see window-boxes everywhere they can possibly be managed. His great objection to many houses nowadays is that they have no window-sills, consequently it is an expensive matter to build a window-box to suit modern houses. He went on to say :

" Mr. GREEN has told you how to maintain a succession of flowers throughout the season and he has a vast experience in these matters and you cannot go far wrong in bearing any advice he has given you in mind.

" With regard to the renovation of the soil in the boxes, as Mr. GREEN has pointed out, many of your plants will have new soil in them, and if you get a trowel and churn up the soil well when you are going to put in a fresh lot of plants, you need not worry very much about it. If you want something to surface your box with, may I suggest that you use granulated peat ; you do not then have the objection which some people find in seeing the earth appearing on the top of the window-box, and moreover if you use granulated peat, it helps to conserve the moisture in the soil during the dry weather, and you will never have any weeds, because granulated peat is sterile, and if an occasional weed does come from somewhere else, you can pull it out with your fingers quite easily.

" Window-boxes usually suffer from over-watering rather than under-watering. Of course one always has to remember when there are rooms below, it is possible to disturb one's neighbours below by over-watering plants.

' I can remember quite well when window-boxes were extremely popular in London. I also remember many years ago when they used to be extremely popular in the city of York. In those days there was a great annual festival or gala in York, and there was always a fine display of window-boxes and hanging baskets. People put in their plants in good time so that there should be a display in time for the great floral fête and gala.

" It would be a fine thing if throughout London we could encourage the use of window-boxes once again. In my own locality I have endeavoured to persuade the tradesmen to put up window-boxes and make displays immediately over their shops, but I have found it very difficult to persuade them to do so, even when I have offered prizes for the best window-boxes under those conditions.

" I remember not so many years ago making a wonderful display with the Ivy-leaf Geranium ; there you have a double advantage, you can grow your plants up and down : they will grow when staked up to 2 feet long and the others will hang down, and they flower amazingly.

" I was wondering whether Mr. GREEN was going to tell us about the old red, white and blue window-box—some of you will remember the scarlet Geraniums, the white Marguerites and blue Lobelias, the real national colours. I do not like that particular arrangement so far as window-boxes are concerned, but I would rather see those than so many blank windows as there are in London to-day. I hope what Mr. GREEN has said will encourage all of you to cultivate your window-boxes ; you will find these small gardens vastly interesting and entertaining to the folk you invite to your houses, and they will add colour and beauty and often fragrance to the place, and so increase the general amenities of the district in which you live. We must remember in regard to window-boxes, it is not our own satisfaction we are considering entirely, although that may be their first reason, but so many people who go past your house will be able to see beautiful flowers growing in your window-boxes. That in itself will be an inspiration to others to go and do likewise."

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Asystasia bella. **A.M.** June 20, 1939. From Lt.-Col. C. H. Grey, D.S.O., Cranbrook. A very ornamental South African shrub suitable for the cool greenhouse, where it forms a shapely, evergreen bush 6 feet or more in height. The leaves are 2 to 4 inches long, ovate-oblong and sinuately toothed. The flowers are tubular with five spreading, more or less reflexed lobes of pale lilac delicately veined with purple, and are borne in many-flowered terminal racemes. The species is figured as *Mackaya bella* at t. 5797 of the Botanical Magazine.

***Calceolaria 'Rubin.'** **A.M.** May 25, 1939, for general garden use. Raised and sent by Mr. Hans Chr. Hansen, " Stormly," Vanlose, Copenhagen, Denmark. Plant of compact free-branching habit, 12 inches tall, very free-flowering. Flowers ¾ inch diameter, deep rich brownish-crimson. Propagated from cuttings.

Cypripedium × 'Miracle' var. 'Alpha.' **A.M.** June 20, 1939. This handsome hybrid gives evidence of belonging to the Harrisianum section. Unfortunately, the seed-bearing parent is of unrecorded origin, but the pollen parent is *C.* × 'Nubian.' The dorsal sepal is rose with crimson shading and bears bold dark crimson-purple lines. The petals and labellum are mainly mahogany-red. Exhibited by H. P. Lawson, Esq., " Lynbrook," Knaphill, Woking.

Cyrtanthus Flanaganii. **A.M.** June 6, 1939. From Collingwood Ingram, Esq., Benenden. A small bulbous plant from the Drakensberg Mountains, stated by the exhibitor to be quite hardy in this country. The scape is about a foot high and carries eight flowers. The perianth is 2 inches long, tubular, with spreading, ovate lobes of aureolin yellow (H.C.C. 3/2).

Delphinium 'Bluebell.' **A.M.** June 23, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore and Langdon, Bath. Flower spikes pyramidal in shape with evenly spaced semi-double flat flowers, 2 inches across, rich gentian-blue with a faint mauve flush ; eye prominent, of medium size, white.

Delphinium 'Crystal.' **A.M.** June 23, 1939, as an exhibition variety. Flower spikes strong, pyramidal, with evenly spaced, semi-double flowers, 2¼ inches across, cobalt-blue (H.C.C. 44/2) with a faint pinkish-mauve flush ; eye small, white.

Delphinium 'Ellen Wort.' **A.M.** June 20, 1939, as an exhibition variety. Raised and shown by Mr. B. G. Wort, Upper Woodcote Village, Purley, Surrey. Flower spikes pyramidal with rather closely arranged semi-double flowers, 2½ inches across, oriental blue (H.C.C. 37/2) faintly flushed neyron-rose (H.C.C. 623/3) ; eye small, white.

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* After trial at Wisley.

Delphinium 'Myra.' A.M. June 23, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore and Langdon, Bath. Flower spikes of medium length with closely spaced semi-double flowers, 2¼ inches across, spectrum blue self (H.C.C. 45/2); eye small, blackish.

Delphinium 'Percy Godfrey.' A.M. June 13, 1939, as an exhibition variety. Raised and shown by Mr. F. A. Bishop, The Glade, Clewer Green, Windsor. Plant 6 feet tall, vigorous, with flower spikes 4 feet long, pyramidal, and few strong side spikes. Flowers semi-double, evenly spaced on the spike, 3 inches diameter, inner petals heliotrope (H.C.C. 633/3), outer petals flushed at middle, cerulein blue (46/1); eye of medium size, sepia.

Delphinium 'Violetta.' A.M. June 23, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore and Langdon, Bath. Flower spikes pyramidal with rather closely arranged flowers each 2½ inches across, semi-double, amethyst violet (H.C.C. 35), outer petals tipped campanula-violet (H.C.C. 37); eye of medium size, brownish with golden hairs.

***Dianthus plumarius 'Ariel.' H.C.** June 16, 1939. Plant vigorous, bushy, 15 inches tall, free-flowering; flowers of good form, semi-double, useful for cutting, diameter 1¾ inch, bright rose. Sent by Mr. E. Ladhams, Elstead Nurseries, Godalming.

***Dianthus plumarius 'Ceres.' H.C.** June 16, 1939. Plant vigorous, bushy, 12 inches tall, free-flowering; flowers of good form, semi-double, useful for cutting, diameter 1¾ inch, pink with deep maroon zone at eye. Sent by Mr. E. Ladhams.

***Dianthus plumarius 'Emperor.' A.M.** June 16, 1939. Plant vigorous, bushy, 12 inches tall, free-flowering; flowers of good form, semi-double, useful for cutting, rich rosy-red with a maroon red blotch at centre, diameter 1¾ inch. Sent by Mr. E. Ladhams.

Epilobium angustifolium 'Isobel.' A.M. June 20, 1939. From Messrs. Perry, Enfield. An un-named pink-flowered variety of the Rose-bay Willow-herb received the **A.M.** on June 19, 1934, and is described in the JOURNAL, vol. **59,** p. 446. The present variety is similar, if not identical, and has flowers of Phlox pink (H.C.C. 625/3).

Eriophorum Scheuchzeri. A.M. June 20, 1939. From Messrs. Perry, Enfield. A species of Cotton-grass widely distributed in northern temperate and arctic regions. It is a bog plant of stoloniferous habit, the growths producing a few short linear leaves and erect, terete stems nearly 2 feet high bearing solitary terminal flower-heads. In the fruiting stage the heads resemble tawny-tinted balls of cotton-wool.

Gaulnettya × 'Wisley Pearl.' A.M. June 20, 1939. From the Director, R.H.S. Gardens, Wisley. A very pretty evergreen shrub believed to be a natural hybrid between *Gaultheria Shallon* and *Pernettya mucronata.* For a detailed description and figures of this plant see p. 125.

Gaultheria sinensis. A.M. April 25, 1939. Shown by Mr. W. J. Marchant, Wimborne, Dorset, as a hardy shrub for the rock garden.

* After trial at Wisley.

An evergreen species from Yunnan, Tibet, and Upper Burma, prostrate, matted, up to 6 inches high, bearing solitary, axillary, urn-shaped white flowers succeeded by deep blue berries, and small ovate glossy leaves. Raised from seed collected by Kingdon Ward under number 8562.

Indigofera decora alba. A.M. June 20, 1939. From Mr. W. J. Marchant, Wimborne. *Indigofera decora* received the **A.M.** on September 12, 1933, and is described in the JOURNAL, vol. **59**, p. 305. The variety differs from the type chiefly in having pure white flowers. It is an uncommon sub-shrub from China and Japan, with delicate pinnate leaves and Pea-like flowers in long axillary racemes.

Lilium 'Picotee.' A.M. June 20, 1939. From Messrs. Constable, Burnham. The hybrid Lily known as *Lilium* × *princeps* was raised some twenty years ago from seed of *L. Sargentiae* crossed with pollen of *L. regale*. The intercrossing of selected seedlings of *L.* × *princeps* has given rise to many varieties, and 'Picotee' is one of the most distinct. The flower is 5 inches long, 6 inches in diameter. Internally the colour is pearl-white, stained with yellow at the base and broadly margined with rhodamine purple (H.C.C. 29/3). The outside of the perianth is deeply suffused with bronzy-rose.

Miltonia × 'Melina' var. 'Purple Queen.' A.M. June 20, 1939. A beautiful form, rich ruby-crimson in all the segments, except for a yellowish crest area on the base of the labellum. Obtained by crossing *M.* × 'Memoria H. T. Pitt' with *M.* × 'Mrs. J. B. Crum.' Exhibited by Messrs. J. A. McBean, Cooksbridge.

Orchis elata. A.M. June 20, 1939. From Mrs. Sadleir, Celbridge, Co. Kildare. A very striking hardy terrestrial Orchid about 3 feet in height, with a very dense spike, 8 to 10 inches long, of imperial purple flowers (H.C.C. 33).

Pentstemon secundiflorus. A.M. June 20, 1939. From the Director, R.H.S. Gardens, Wisley. A distinct species with straight, slender stems 2 to 3 feet high bearing lanceolate leaves up to 3 inches long and widely-spaced axillary clusters of about six flowers. The flower is broadly tubular, 1½ inch long, the lobelia blue lip (H.C.C. 41/1) toning effectively with the violet (36/2) hue of the tube.

Phyllodoce aleutica. A.M. April 25, 1939. Sent by Mr. W. J. Marchant as a hardy plant for the rock garden. A dwarf evergreen shrub native in north China and north-west America bearing thick terminal clusters of white campanulate flowers, and at the ends of the branchlets whorls of stiff lanceolate leaves.

Prunus Persica foliis rubris. A.M. June 20, 1939. From Messrs. Russell, Windlesham. A very good ornamental-foliaged Peach. The mature leaves are purple beneath, dark bronzy-green above, the young shoots bright reddish-purple.

Rhododendron × 'Angelo' var. 'Solent Queen.' A.M. June 6, 1939. *R. discolor* × *R. Griffithianum*, sent by Lionel de Rothschild, Esq., Exbury, Southampton, as a hardy flowering shrub for general garden use. Large loose trusses of about ten widely funnel-shaped sweet-scented flowers, very pale rose fading to almost pure white, green-spotted within, up to 5 inches across by 2½ inches deep; calyx irregularly lobed, up to ½ inch long, pink-margined. The ovate, obtuse, glabrous, slightly cordate leaves are up to 9 inches long by 3 inches broad.

Rhododendron × **'Antonio.'** **A.M.** June 6, 1939. The result of crossing *R. discolor* and *R.* × 'Gill's Triumph.' Sent by Lionel de Rothschild, Esq., as a hardy flowering shrub for general garden use. The loose trusses are up to 8 inches across by 5 inches deep and bear about ten funnel-shaped flowers as much as 4 inches across by 3 inches deep, suffused rose-pink fading slightly with age, crimson blotched and spotted within. The obtuse leaves, rounded at the base, are dull green above, paler below, glabrous, up to 8 inches long by 2½ inches wide.

Rose 'Cantab.' **A.M.** June 6, 1939. From the Director, University Botanic Garden, Cambridge. A very attractive hybrid raised by Dr. C. C. Hurst from the cross *Rosa nutkana* × 'Red Letter Day.' The flowers are 3 inches in diameter and very sweetly scented, with broad petals of rhodamine purple (H.C.C. 29/2) becoming a little paler with age. The shoots are sparingly thorny and bear medium-sized leaves with five or seven leaflets.

Silene Wherryi. **A.M.** April 25, 1939. Exhibited by the Chez Nous Nurseries, Newick, Sussex, as a hardy plant for the rock garden or alpine house. A dwarf densely tufted species bearing a profusion of large bright pink flowers. Native in Alabama and Kentucky, U.S.A.

Syringa 'Audrey.' **A.M.** June 6, 1939. From Lady Lawrence, Dorking. Although the parentage of this Lilac was not stated, it appears to be one of a number of hybrids raised by Miss Isabella Preston of the Central Experimental Farm at Ottawa from crosses between *S. villosa* and *S. reflexa.* The narrowly tubular flowers of pale magenta (H.C.C. 27/3) are borne in large terminal bunches of freely-branched panicles nearly a foot long.

NARCISSI AT WISLEY, 1937–39.

The trial of Narcissi was inspected several times during the spring of each year by the Narcissus and Tulip Committee and their recommendations made in the spring of 1939 are given below. The flowering period given is for 1939; this on the whole corresponds with 1937, but is about a week to ten days later than in 1938.

Class 1a.

Charles I, A.M. 1939. Described Journal R.H.S., **61**, p. 303 (**C.** 1936).

Sulphur Prince, A.M. 1939. Described Journal R.H.S., **61**, p. 303 (**H.C.** 1936).

Worlington, A.M. 1939. Raised and sent by Miss K. M. Hinchliff of Instow, Devon. Flowering from April 5 to May 4. Vigorous, foliage grey-green, 22 inches long, stem 28 inches long. Flower 4½ inches across, canary-yellow (H.C.C. 2/1), trumpet aureolin (H.C.C. 3); perianth 1⅞ inch long, somewhat twisted; trumpet 2 inches long, expanded. Flowers forty-five in first year, fifty-seven in third.

Golden Ray, H.C. 1939. Described Journal R.H.S., **61**, p. 303 (**C.** 1936).

The following variety has been included in the trial:

Sir Francis Drake (Carters).

Class 1b.

Mrs. Ernst H. Krelage, H.C. 1939. Described Journal R.H.S., **61**, p. 304 (**C.** 1936).

The following variety has been included in the trial:

William (Thornton).

Class 2a.

Carlton, F.C.C. 1939. Described Journal R.H.S., **61**, p. 306 (**A.M.** 1936).

St. Ives, A.M. 1939. Described Journal R.H.S., **61**, p. 307 (**H.C.** 1936).

Malvern Gold, H.C. 1939. Raised and sent by Mr. H. A. Brown, Fern Tree Gully, Victoria, Australia. Flowering from March 7 to April 19. Vigorous, foliage bright greyish-green, 16 inches long, stem 20 inches long. Flower 4 inches across, canary-yellow (H.C.C. 2/1), corona lemon-yellow (H.C.C. 4/1); perianth 1¾ inch long; corona 1⅜ inch deep, expanded, frilled at mouth. Flowers nine in the first year, thirty-seven in the third.

Pepper, C. 1939. Raised and sent by the late Mr. P. D. Williams. Flowering from March 17 to April 20. Foliage 11 inches long, stem

14 inches. Flower 3¼ inches wide; perianth 1½ inch long, twisted, canary-yellow (H.C.C. 2/1); corona ⅝ inch deep, funnel-shaped, marigold-orange (H.C.C. 11). Flowers twenty in first year, fifty in third.

The following varieties have been included in the trial:

CHEERIO (Williams).	VELVETEEN (Habershon).

Class 2b.

Warlock, F.C.C. 1939. Described JOURNAL R.H.S., **61,** p. 308 (**A.M.** 1936).

The following varieties have been included in the trial:

MISS MATTY (Thurston).	VESPA (Bath).

Class 3a.

The following variety has been included in the trial:

GULLIVER (Farrow).

Class 3b.

The following varieties have been included in the trial:

PRINCE (Bath).	SANTA CRUZ (Watts)

Class 4a.

Snow Queen, A.M. 1939. Described JOURNAL R.H.S., **61,** p. 312 (**C.** 1936).

Girdle, H.C. 1939. Described JOURNAL R.H.S., **61,** p. 311 (**C.** 1936).

The following varieties have been included in the trial:

EDRIC (Bath).	HAPPY EASTER (Bath).

Class 4b.

The following variety has been included in the trial:

FREMEAUX (Thornton).

Class 5a.

The following variety has been included in the trial.

CRESTA (Watts).

Class 5b.

The following variety has been included in the trial.

JOY BELLS (Copeland).

Class 6.

The following variety has been included in the trial:

FAIRY WINGS (Crouch).

Class 7.

The following variety has been included in the trial:

GOLDEN PERFECTION (Farrow).

Class 8.

White's Hybrid, A.M. 1939. Described JOURNAL R.H.S., **61,** p. 314 (**H.C.** 1936).

The following variety has been included in the trial:

OWL (Copeland).

Class 9.

Floore, A.M. 1939. Raised and sent by Miss Thornton, Brockhall, Northampton. Flowering from April 13 to May 9. Vigorous, foliage greyish-green, 18 inches long; flower stems stiff, 22 inches long. Flowers 4 inches across; perianth overlapping for ½ length of each segment, creamy-white, tinged sulphur at the base; corona ¼ inch deep, saucer-shaped, creamy-sulphur edged, orange-scarlet. Flowers sixteen in first, forty-one in third year.

Caedmon, H.C. 1939. Described JOURNAL R.H.S., **61**, p. 315 (**C.** 1936).

The following variety has been included in the trial:

LAMPLIGHTER (Wilson).

Class 10.

Cheerfulness, F.C.C. 1939. Described JOURNAL R.H.S., **61**, p. 315 (**A.M.** 1936).

The following varieties have been included in the trial:

BRYN ELLEN (Watts).
LORD KENYON (Watts)
JUNKET (Watts).
MRS. WM. COPELAND (Copeland).

THE AWARD OF GARDEN MERIT.—L.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

250. CYTISUS BATTANDIERI.

Award of Garden Merit, June 20, 1938.

We are apt to regard the plants of Morocco as being tender, as indeed many of them are, but *Cytisus Battandieri* has proved hardy, both as a young and as a comparatively old plant, in many gardens in this country, even in and around London. The May frosts of 1937 did it no damage. Though its leaves may be damaged in winter, as often happens in its native home near the groves of *Cedrus atlantica* in the Middle Atlas at 5,000 or 6,000 feet altitude, it suffers no permanent injury thereby.

It grows to about twelve feet in height, making a large bush, and both its stout young shoots and its leaves are covered with silky hairs, so that it has a silvery appearance. The three sessile leaflets of which the leaves are composed, set on stalks about two inches long, are 1½ to 3 inches long and 1 to 1½ inch broad.

It flowers in June on erect five inch long racemes crowded with short-stalked golden-yellow flowers, each about half an inch across, pleasantly scented of lemon. It is thus a beautiful shrub, and it seems to demand nothing special in the way of soil so long as the drainage is good and the soil sweet, and it does not object to lime. It wants, of course, a place in the sun like most of its genus.

C. Battandieri was not named until 1915, was introduced about 1922, and shown at Vincent Square by Mr. T. HAY in 1931, when it gained an Award of Merit, and in 1934, when a First Class Certificate was awarded.

It seems to set seed freely and the seeds germinate readily. The time of its flowering, just after *C. scoparius* and its numerous varieties, and just before *Genista cinerea* and *G. virgata,* which are followed in their turn by *Spartium junceum* and *Genista aethnensis*—all of which have received the Award of Garden Merit—gives us a sequence of beautiful yellow-flowered shrubs of bold appearance and graceful and accommodating habit, fit for any garden.

251. RHODODENDRON RUSSATUM.

Award of Garden Merit, June 20, 1938.

Rhododendron russatum belongs to the Lapponicum section of the great genus Rhododendron. An idea of the character of the species comprised within the Lapponicum section may be obtained from the coloured illustration in this JOURNAL, **59**, p. 227, reproduced from the beautiful painting by Miss SNELLING of one of the species.

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* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title Some Good Garden Plants. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL, R.H S., vol. **63**, pp. 190, 246, 448 and 546; **64**, pp. 134, 232, and 290.

R. russatum may be accounted one of the best of the Lapponicums, being of bushy habit with dense evergreen foliage, flowering freely, with rich vivid purple-blue flowers in March and April. Like most other Rhododendrons this demands a lime-free soil, and at least in the south is perhaps best with some slight shade in summer. It is a dwarf species, quite hardy, slowly attaining its ultimate height of three feet so that it will never be too large for a small garden.

Both stems and leaves are very scaly. The oval leaves, rounded at the apex, are about ¾ to 1½ inch long, dark green above and rusty yellow below, their stalks 1/16 to 1/6 inch long. The almost stalkless flowers are in clusters of five to ten, and the reddish-stalked stamens and style add to the vivid colouring of the corolla which is about an inch wide and composed of five petals spreading from a funnel-shaped tube, like the stamens and the style hairy at the base.

GEORGE FORREST discovered *R. russatum* at an elevation of 12,000 feet in Yunnan, and introduced it in 1913, and he also introduced the form which is figured in the Botanical Magazine, t. 8963, under the name of *R. cantabile*, which differs in details too small to warrant separating it as a distinct species. Indeed seed of *R. russatum* may give seedlings approaching or even identical with the figure of *R. cantabile* in the Botanical Magazine.

R. russatum received the Award of Merit in 1927, and the First Class Certificate in 1933.

252. CLEMATIS ARMANDII.

Award of Garden Merit, June 20, 1938.

E. H. WILSON introduced *Clematis Armandii* from near Ichang, China, when collecting for Messrs. J. VEITCH, in 1900, though it was known to botanists earlier, having been named by FRANCHET in 1885, after the French Missionary Père ARMAND. It is a remarkable and beautiful plant both in its glossy evergreen foliage, becoming dull only with age, and in its clusters of white flowers. It is hardy against a wall over most of the country and like many other very strong climbers it is apt to become bare in its lower part ; it will cover a wall 30 or 40 feet high. Its leaves are of three ovate-lanceolate leaflets, pointed, conspicuously three-veined, and quite smooth. The leaflets are up to 5 or 6 inches long, quite smooth, each on a twisted stalk (by which the plant clings to its support) about an inch long, and these spring from a main stalk up to 4 inches long, but variable in length.

The flowers are produced in April, but in some seedlings much earlier, and are in dense clusters in the axils of the leaves. There is sometimes a second flowering in late August or September. The sepals are long and narrow, the flower being 2 to 2½ inches across, but variation is seen in different seedlings in the comparative length and breadth of these sepals. They may be quite white or cream or tinged with rose as in the beautiful variety 'Apple Blossom.' As the white or cream flowers age they often become tinged with rose. It likes a moist well-drained soil, and calls for no pruning unless it is desired to limit its bounds.

There is a good figure of the plant in this JOURNAL, **40**, p. lxiv, made from the plant that gained the First Class Certificate in April, 1914. The illustration of the dried specimen collected in Ichang (JOURNAL R.H.S., **28**, p. 59) does not do it justice. The variety 'Apple Blossom' gained the Award of Merit in 1926.

Enough has been said regarding variability within the species to indicate the desirability of propagating from the best seedlings and fortunately this can be done by means of cuttings. So one may secure plants flowering over a considerable period; plants with well-shaped flowers; plants more ready to flower, for some seem rather inclined to vigorous growth, than to free-flowering; plants with different shades of colour; and all beautiful.

253. ROSE 'PAUL'S SCARLET CLIMBER.'

Award of Garden Merit, July 27, 1931.

Not so vigorous as, for instance, 'American Pillar' or 'Crimson Rambler,' yet 'Paul's Scarlet Climber' will easily cover a wall or fence to a height of 10 feet or so, and may be compared in vigour with that other fine climber, the thornless and almost perpetual-flowering 'Zephyrin Drouhin.' 'Paul's Scarlet Climber' is not quite so perpetual as 'Zephyrin Drouhin,' but it begins to flower in early June and continues for weeks, thereafter producing a few flowers. The flowers are about 3 inches across when fully open, flattish double or semi-double, produced in clusters of three to eight or nine, and very freely. The buds are very beautiful and the flowers vivid scarlet with scarcely any tendency to blueness as they age, as have so many scarlet roses.

Like most roses this likes a good soil not apt to become very dry in summer, and a sunny aspect, and like most pillar roses and climbing varieties of hybrid tea roses this is best not pruned in the season after planting and it calls for less drastic pruning than many of the Wichuraiana Roses. The shortening back of laterals that have flowered in late September and the tying in of strong young growths to take the place of old ones worn out is all that is required.

'Paul's Scarlet Climber' was raised by Messrs. WILLIAM PAUL of Waltham Cross and received an Award of Merit when shown by that firm at the Chelsea Show in 1915, and the Wisley Rose Award, Class I, in 1926 after trial at Wisley. It is the result of a cross probably between a hybrid tea rose and a Wichuraiana.

VEGETABLES FOR AUGUST SOWING.

By E. A. Bunyard, F.L.S.

Although the height of summer has passed we have several weeks of good growing weather before us.

There are many vegetables which can yet be sown, and though not all will reach their largest size, they will be very useful in the winter months, and in the case of root vegetables, all the better for a shorter growing period than is usually allowed. Quick growth and medium size will give us tenderness. One rule governs all late sown vegetables—they must not be transplanted. Sowing and thinning on the ground are the only methods which can be used, the delay of growth caused by transplanting must always be avoided.

The following root vegetables can be sown in August: Beet, Carrots, Turnips, Onions and Kohl Rabi. All will grow to a useful size and can be left in the soil during winter until required, in the average southern English climate.

In severe weather a covering of ashes, bracken or straw should be used to protect the more tender ones, Beet and Carrots.

It is convenient, bearing in mind the possible need of such protection, to make several short rows side by side, rather than a few long rows which cannot so readily be protected.

In the Brassica or Cabbage family there are quite a number which may now be sown, provided that they, also, are not transplanted as usual. Varieties must be suited for this purpose and the Cabbage ' Harbinger ' will respond and develop small heads in October.

The early varieties of Savoys should also be chosen.

We have no more valuable green winter vegetables than the Kales, which are so hardy and easy to grow and well flavoured also.

As we now know, the beneficial vitamins of vegetables are associated with the green leafy parts and the white hearts of Savoys and Cabbages are not so valuable as the external green leaves.

Kales are all green and of the greatest value in the late winter when green stuff and fruit are getting scarce. The old ' Cottagers ' Kale probably gives as much for a given space as any vegetable, but all the standard varieties are good. Plant these always on firm soil.

Other green leaf vegetables which may still be sown are Endive, especially the Batavian varieties; Spinach—both for October use, and the Prickly Spinach for winter.

Spinach Beet or Sea Kale Beet is one of the hardiest of all vegetables and the green leaf, though not so good as the true Spinach, is very useful and welcome in a hard winter when other green stuff is scarce.

Turnips sown in August will give us a good cutting of ' Greens ' in spring and are hardy and productive.

Onions are normally sown in autumn for transplanting in spring, but if some of the silver-skinned varieties are sown at once they will produce, with good weather, some useful small bulbs.

Onions to eat young in salads can of course still be planted and seem to like the moister autumn conditions.

If the weather following sowing should be hot and dry, watering must be done as in spring sowings. The autumn dews greatly help vegetables sown at this period and, except in a drought, growth will be rapid and healthy.

Fuller information and cultural directions will be found in the pamphlet entitled 'Autumn Vegetables from seeds sown in July and August,' published by the Society. (Price 3*d*., post free.)

GARDEN NOTES.

Pteridophyllum racemosum.—For a shady spot in the rock garden *Pteridophyllum racemosum* forms quite a pleasing little plant. When in flower it is distinctly attractive notwithstanding the somewhat disparaging description of it given in The Botanical Magazine, where it is figured under t. 8743, and the quaint similarity of its leaves to the Hard Fern always makes it an object of interest.

The plant seems to require, or at any rate prefer, a light woodland leaf-mouldy soil with plenty of moisture. It is definitely hardy and has never been damaged by frost in the most severe weather.

Botanically allied to the Poppy family, it is the sole species of the genus Pteridophyllum and is a native of the mountains of Central Japan (fig. 87).—*C. H. Musgrave, Hascombe.*

Iris nepalensis D. Don. (Iris sp., G.S. 2608–2617).—This most interesting Iris flowered for the first time at Wisley during the early weeks of June in the frames adjoining the Alpine house. Raised from seed received from LUDLOW and SHERRIFF'S Expedition to S.E. Tibet in 1936, it has only taken two years to attain the flowering stage. The large flowers on one-foot stems are lavender-violet, and although of undeniable beauty, they are far too fugitive to be of much value in the garden. The individual flowers last about eight hours and some two or three days may elapse before the next flower expands.

Botanically this Iris is most interesting owing to its unique root system (white fleshy roots with a resting bud in the remains of old foliage) and the linear leaves, which have one strong rib on one side and two on the other.

There are several figures of this Iris, that in W. R. Dykes' The Genus Iris being the most accurate.—*J. T. Wall, Wisley.*

The Chrysanthemum Midge, Diarthronomyia sp.—This Gall-Midge has been known in North America as a serious pest of indoor Chrysanthemums since 1915, and has been found attacking these plants in England in 1927, 1936 and 1938. These outbreaks were traced to Chrysanthemum varieties which had been imported from the United States.

This pest is a very troublesome one, and it behoves the grower of Chrysanthemums to keep a careful watch on his plants for its presence, which should at once be notified to the Ministry of Agriculture, 10 Whitehall Place, London, S.W. 1, as this insect is scheduled as a notifiable pest under the Destructive Insects and Pests Act of 1933.

The Midge gives rise to cone-shaped galls on the leaves (chiefly on the upper surface), stems, buds and developing flowers, in which the minute whitish, legless larvae or maggots live. Heavily infested plants are dwarfed, distorted and produce a poor crop of flowers.

Breeding is continuous throughout the year, but the larval stage is protracted in summer and in winter. The chief periods of activity are in early spring, when cuttings are being taken and rooted, and in autumn during the blossoming period.

The adult Midge is a very small reddish-yellow two-winged fly, not more than $\frac{1}{10}$th inch in length, with long legs and long antennae (feelers). The female Midge lays one hundred or more eggs on the small hairs of the newly-developing leaves. The eggs hatch in a few days, and the young larvae burrow into the tissue of the plant, where they feed and give rise to the characteristic galls. The larvae live within the galls for three to four weeks or longer, and when full fed, change to oval brownish puparia within the galls. The adults emerge from the galls after ten or more days.

Besides the greenhouse Chrysanthemum, *C. indicum* and its varieties, this Midge has been reared from *Chrysanthemum rubellum*.—*G. F. Wilson, Wisley.*

Beschorneria Dekosteriana.—We are indebted to Sir MARK COLLET for the opportunity of illustrating this curious native of Mexico, which is growing in his garden at Ballamanaugh in the Isle of Man. The plant was put in two years ago when quite small, and in early June this year had produced a stem 9 feet 6 inches high and 6 inches in circumference at its point of emergence from among the leaves. It bore 43 branches of flowers, an extraordinary effort, as Sir MARK says, for so young a plant. It thrives best in a dry soil and flowers regularly in Sir MARK's garden in the south of France.

It was figured in the Botanical Magazine, t. 6768, and is frequently known as *B. argyrophylla*.

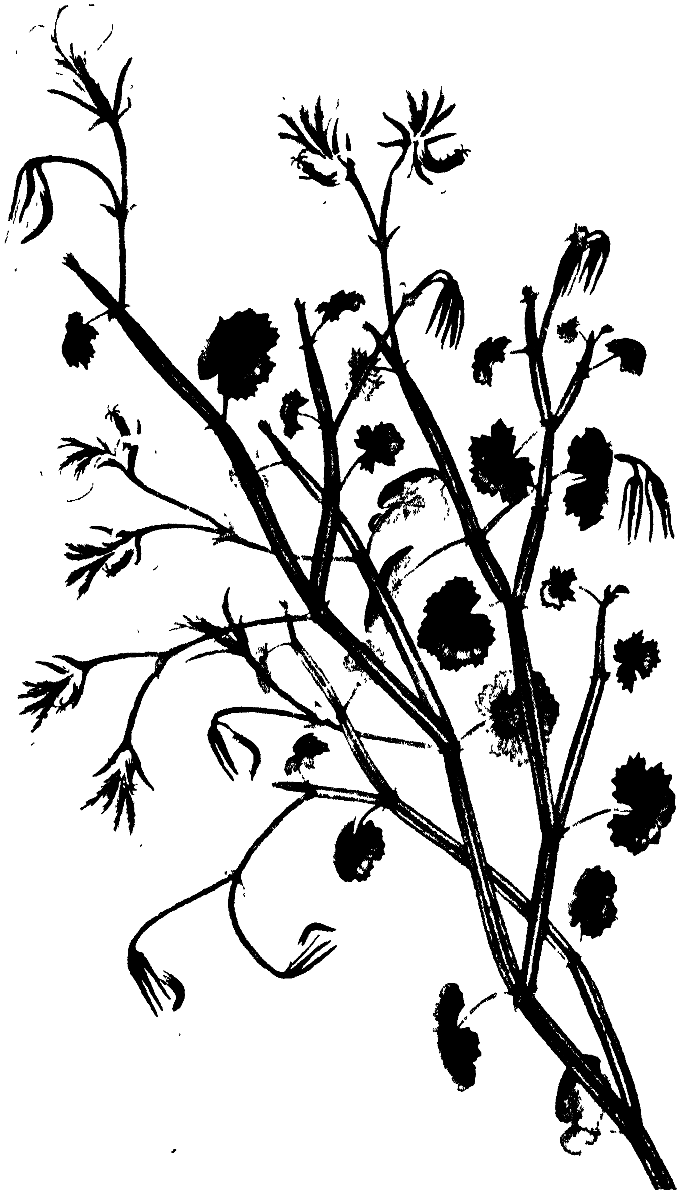

FIG. 85. PELARGONIUM TETRAGONUM WITH SWOLLEN CACTOID STEMS, AND FLOWERS IN WHICH THE TWO UPPER PETALS ARE LARGE AND ONLY TWO OF THE LOWER THREE PETALS ARE DEVELOPED

(p. 357)

[*To face p.* 380

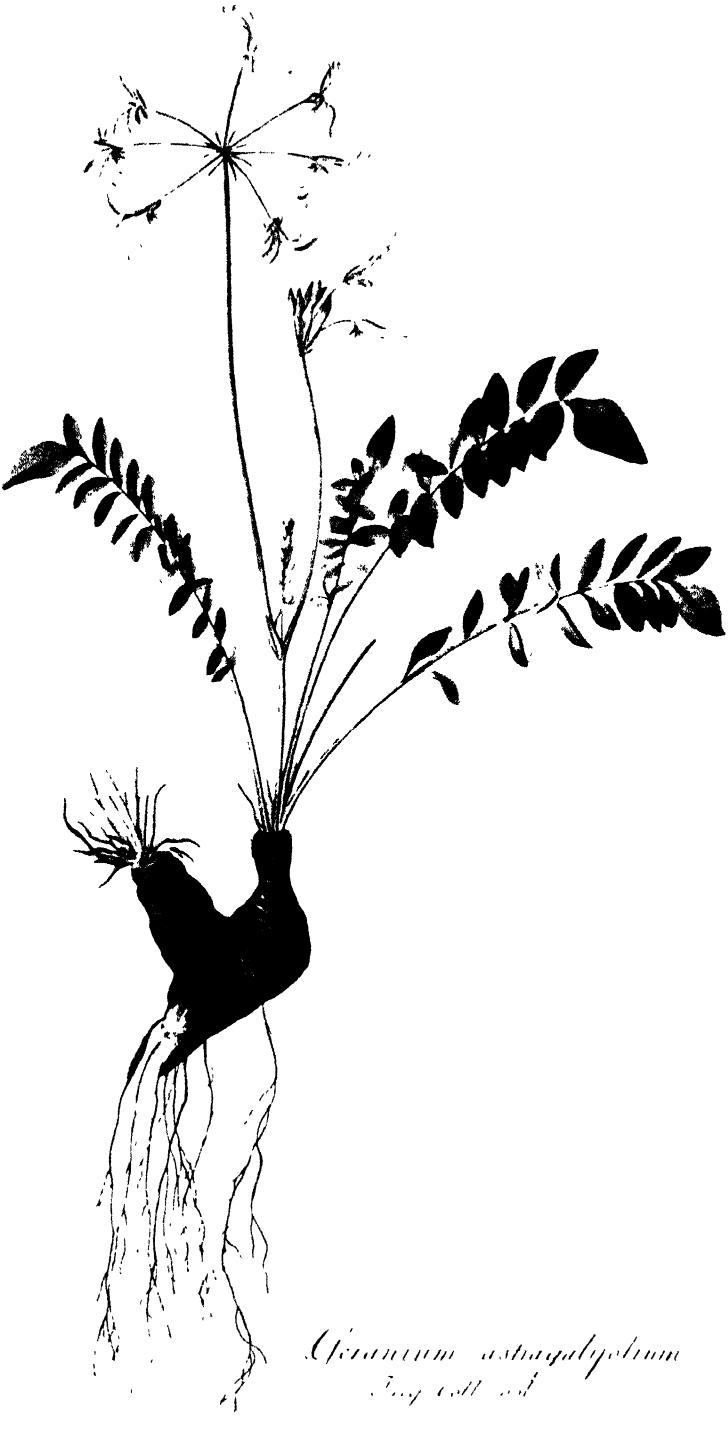

Fig. 86.—Geranium astragalifolium showing the pinnate leaves and the typical Pelargonium flower with three petals below and two petals above

(p 357)

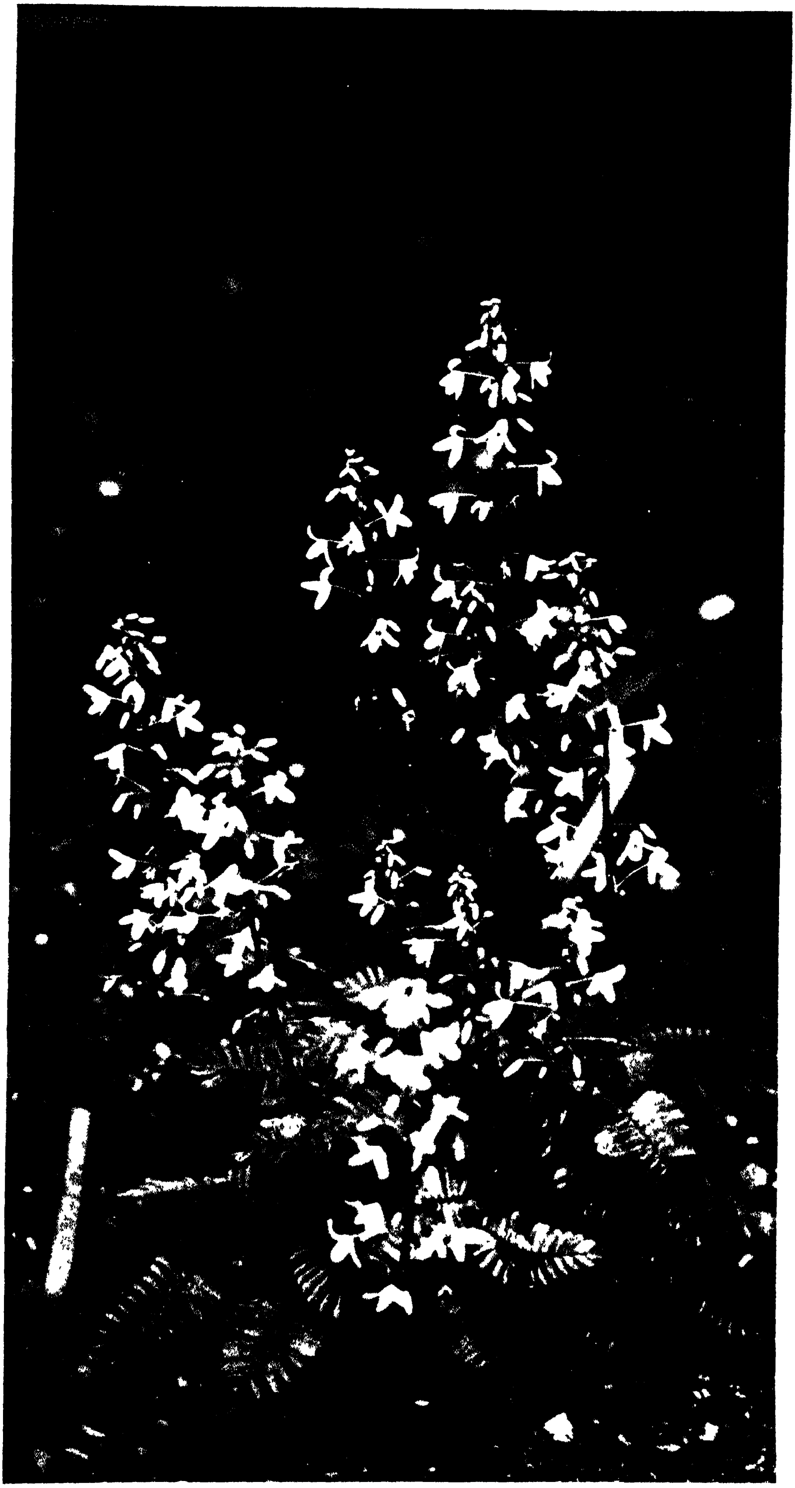

FIG 87.—PTERIDOPHYLLUM RACEMOSUM
(p 379)

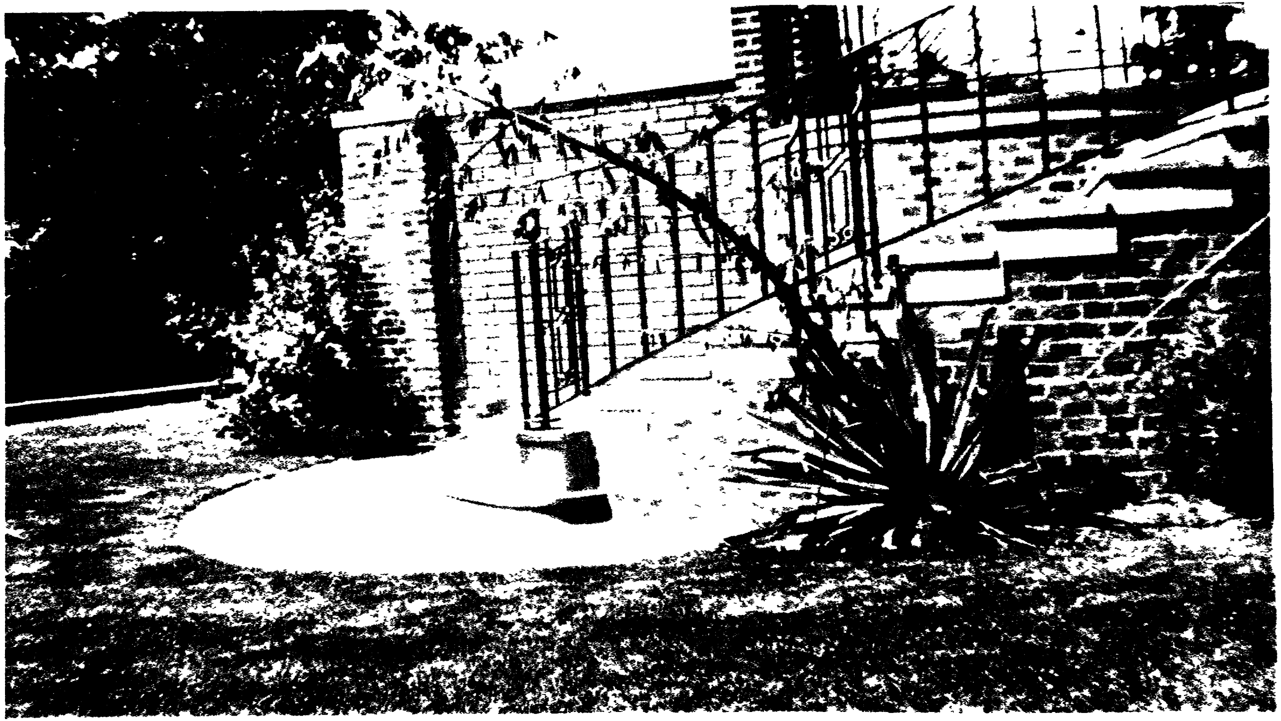

FIG. 88.—BESCHORNERIA DEKOSTERIANA.

P. 380

To face p. 380

SMALL EXHIBITS.

NOTABLE among the small exhibits on June 20 was a well-grown plant of the difficult *Sarmienta repens.* This species is the only member of the genus which belongs to the Gesneriaceae. It forms a prostrate, creeping shrub only 2 or 3 inches high, and when well grown produces an abundance of tubular-campanulate, scarlet, axillary flowers about 1 inch long.

The plant is best grown in a shady position in a moist house, and requires plenty of water. It is native in Chile.

Exhibited by LORD SWAYTHLING, Townhill Park, Southampton.

The uncommon *Buddleia tubiflora* was also shown on this occasion —an attractive plant with erect, tubular, orange flowers about 1 inch long borne in dense many-flowered heads. According to DE CANDOLLE, by whom this species was first described, the leaves are longer than those of *B. grandiflora*, with which he considered it to be closely allied.

As this plant is a native of Brazil, it is presumably tender.

Exhibited by the Hon. L. PALMER, The Old House, Wonston, Hants.

Other exhibits on this occasion included *Leucothoe Davisiae*, shown by Mrs. A. DESBOROUGH, Tulgey Wood, Broadstone, Dorset; an evergreen species which received an **A.M.** in 1933, and is figured in the Botanical Magazine at t. 6247. It reaches about 3 feet in height and bears dense upright racemes of white bell-shaped flowers. A pretty shrub for a moist lime-free soil.

Oncidium pumilum, about 8 inches tall, with short sturdy dense panicles of small yellow flowers, and *Encyclia oncidioides Mooreana*, with sprays of green, crimson and white flowers about 18 inches long, were both sent by C. H. LANKESTER, Esq., 89 Ditton Road, Surbiton.

BOOK REVIEWS.

"The Garden of Larkspurs." By L. H. Bailey. 8vo. 116 pp. Ill. (Macmillan, New York, 1939.) 13*s*.

An interesting and, in parts, original treatise on the genus Delphinium written by an American for American growers of the plant. Viewed from this standpoint the book contains many pages of matter that will not interest the European grower. For instance, the nicely detailed chapter by W. E Blauvelt on the "Pests of Delphinium" deals with nine pests that can prove disastrous in North America and Canada while, of these, that paragraph dealing with slugs and snails is the only one likely to interest the British reader. Apparently soil fumigants have not yet been employed in America to deal with these pests although they have proved most effective over here, the most popular method being, apparently, that of trapping. In a similar chapter Leon H. Leonian deals with nine fungus diseases of the Delphinium of which we in this country happily have knowledge only of three, viz. mildew, bacterial leaf spot or black spot and Sclerotium rot. I should like to have seen more space devoted to the chapter dealing with "The Breeding of Delphiniums" for it is a known fact that a number of American specialists are advancing in this direction on definite scientific lines as compared with our own rather haphazard method of selection which has served us very well up to recent years but is leaving us in rather a quandary as to what steps are to be taken to guide future development.

The chapter dealing with "The Cultivation of Delphiniums" is full and detailed but, of course, is written from the viewpoint of climatic and soil conditions rather different from our own. Dr. Bailey has tackled the vexed question of classification of the genus with an attack that must command admiration if open to criticism. The annual larkspurs are divided into three groups, viz. Rocket, Forking and Bouquet larkspurs. *Delphinium Belladonna* has aptly been dubbed Garland Larkspur. Less aptly have the tall *elatum* varieties been christened 'Candle' larkspurs, which gives the impression of a race with cylindrical spikes only, whereas the pyramidal type enjoys the greatest favour. Towards the end of his chapter on 'Candle' larkspurs Dr. Bailey deals with their propagation from cuttings and states that "sometimes, also, cuttings are made from tip growths." This is surely an error, for although hollow stems will sometimes root they never produce the perennial plant that is the result of a basal cutting with a crown heel. Vegetative propagation in America has not been practised to any great extent, the most popular method being by seed, which raisers are, in many instances, endeavouring to produce in strains that will produce progeny true to type.

The final chapter deals with the many species of Delphinium and is the most comprehensive of its kind yet seen. There appears still to exist the old doubt regarding the two yellow-flowered species and no one yet appears to know definitely whether *sulphureum* is *Zalil* or *Zalil* is *sulphureum*. The twenty-three line drawings assist the text greatly although the same cannot be said of the coloured frontispiece, which is hardly a compliment to our modern 'Candle' larkspurs.

G. A. R. PHILLIPS.

"Wall Shrubs and Hardy Climbers." By W. J. Bean. 8vo. xii + 181 pp. Ill. (Putnam, London, 1939.) 7*s*. 6*d*.

Except in the crowded streets of great cities and in manufacturing districts where the smoky conditions make the growing of plants more or less impossible there can hardly be a house in the country which does not provide a site on a wall where a climbing plant or a wall shrub can be grown, and the walls of any shed, outhouse or garage are all equally suitable for the purpose.

Generally speaking little use is made of the wall spaces that are available, and it is quite possible that the only plants which the average individual knows for covering a wall are Ivy and what is commonly known as *Ampelopsis Veitchii* (*Parthenocissus tricuspidata*).

Mr. Bean has therefore done a good service to the community at large, and in particular to the owner of the cottage, the villa, and the mansion as well as to the gardening public, in giving us his wide knowledge and experience of the hardy climbers and wall shrubs which can be grown with success in this country.

An introductory chapter of 24 pages forming the first part of the book is full of useful and practical information and should be carefully read. It deals generally with the cultivation of both climbers and wall shrubs, the methods by which the former are supported (i.e., natural or artificial), the pruning of both climbers and shrubs and the various types which are available for different positions and aspects including evergreens.

There can be little doubt that climbing plants are not always satisfactory for walls. They have their uses, but they are often inclined to become "leggy" and to flower only at the top, leaving the lower part of the wall on which they are planted bare. It is here that a place can properly be found for a wall shrub, and Mr. Bean points out that the great value of walls is not so much that they afford room and sites for climbers, but that they provide the conditions which make it possible to grow many beautiful shrubs which are not hardy in the open ground and away from the protection of a wall. Pergolas also are dealt with and the construction of different forms is described with suggestions for suitable planting.

The second or main part of the book deals in alphabetical order with the climbers and wall shrubs which can be grown out of doors, giving a description of each, the purpose or purposes for which it can be used, and how far it is hardy.

It is of course not suggested that all the plants enumerated can be grown in every part of the country Plants which succeed in the open in the south of Cornwall may not prove to be hardy even on a wall in the north and north-eastern districts Care will therefore have to be taken to choose those which are hardy in the locality in which they are to be planted. But the majority should succeed in what is described as "the average climate" of the country. This term is applied roughly to the area lying south of the Tweed to the southern boundary of Surrey.

It will probably come as a surprise to many people to learn that the number of hardy evergreen climbers is extremely small. Ivy is of course the obvious example of such a plant, and it is really hardy, self supporting, and can be cut and trimmed as desired. On the other hand its flowers have no beauty, it harbours dirt and insects, and it has been known to be the means by which rats have obtained access to a building. But, to give the devil his due, as a climber over an old ruin or up the trunk of an old tree it can be extremely picturesque. Though Mr. Bean does not approve of the way in which it is so largely used at the present time for covering the walls of buildings, yet he exonerates the plant from doing as much damage as is generally supposed to brick and stone work which is sound. This, no doubt, may be quite correct, but unfortunately brick and stone work is not put together now as well as it used to be, and a wall which is sound to-day may be faulty to-morrow, and if there is a crack or crevice into which the roots of the plant can penetrate most assuredly will it do so with a result that the wall will be ruined.

The builder has two friends which are and always have been of great value to him. One is inside the house and the other is outside. The former is linoleum and the latter is ivy From the householder's point of view neither of them should be allowed on the premises.

The book contains between 40 and 50 pleasant illustrations of climbers and wall shrubs reproduced from photographs of living plants. It can be recommended to the expert as a book of reference on which reliance can be placed, and it can be particularly recommended to the layman unversed in gardening as a guide to the plants with which he may clothe and beautify the walls of his house and buildings.

C. H. MUSGRAVE.

"Dwarf and Slow-growing Conifers." By Murray Hornibrook. Ed. 2. 8vo. xvi + 286 pp. Ill. (Country Life, London, 1939.) 15s.

The first impression one receives on opening the new and revised edition of Murray Hornibrook's Dwarf and Slow-growing Conifers is the greatly improved format of the book. The first edition, a bulky little volume, was exceedingly awkward to work with, or indeed to handle. The new publication is altogether a better proportioned volume, and is easily persuaded to remain open when laid down—a small point, but one which makes for the comfort and convenience of the reader. The smooth paper and new type are also improvements. It is to be regretted, however, that the method adopted in the earlier work of showing at the top of the right-hand page the name of the genus under consideration has not again been employed. For example, on opening the present volume the eye may fall upon *T. cuspidata, T. plicata*, or *T. canadensis* in the letterpress, which to the knowledgeable conveys Taxus, Thuja or Tsuga, as the case may be. This, however, presupposes a certain familiarity with the subject on the part of the reader which surely it would have been better not to assume. On opening the former volume the eye travelled automatically to the top of the right-hand page to determine the genus, now the novice must often turn back several pages for this information. In a work of this description anything which makes for speedy reference must always be regarded as a distinct asset.

Anyone with but small knowledge of the complicated subject with which Mr. Hornibrook deals cannot fail to be impressed with the vast amount of patience, application and hard work necessary to produce such a comprehensive volume, especially in view of the hopeless confusion which has hitherto existed regarding the nomenclature of dwarf Conifers. Infinite pains have been taken to unravel the tangle, and those interested in the growing of these small trees will find this book indispensable for the identification of their plants, for it can safely be said there are few collections of dwarf Conifers where a few specimens at least are not wrongly named.

It is evident that to have accumulated so much additional material the author, literally as well as figuratively speaking, has covered considerable ground since the publication of the first edition. He has made exhaustive search in private gardens, old nurseries and libraries, not only in Great Britain and Ireland, but also in the United States and the Continent, and he now records over 500 varieties of pygmy and slow-growing trees. New forms are described, old forms still in cultivation are traced to their origins, and many now unfortunately lost to cultivation are noted. All this may sound rather like a dull and uninspired catalogue, but this would be doing the author an injustice, for Mr. Hornibrook is never dull. Naturally, by far the greater part of the book is concerned with describing the genera and species. These descriptions are concise and clear, and readers will find they can "check up" without difficulty on their specimens and rectify their mistakes. For those who feel inclined to make a still more exhaustive study of the subject a comprehensive list of the most important works of reference is given.

Probably the author's opening pages provide what may be generally considered to be the most interesting reading in the book. Here is clearly explained the differences between natural dwarfs and the Japanese artificially dwarfed (Bonsai) trees. Incidentally, there is nothing more irritating to the collector than to hear his choice pygmies referred to as "your Japanese trees." Few people realize that the natural dwarf forms are in most cases as spontaneous as arborescent trees. A large number have originated in the seed-beds of nurseries, others result from hardship and environment, a few only, such as *Picea Abies* var. *tabuliformis, Pinus sylvestris* var. *beauvronensis*, and *Pseudotsuga Douglasii* var. *Astleyi* are what have been described as "pathological cases," i.e. the result of "Witches' brooms."

Suggestions as to the situation and soil which will generally be found suitable follow, but it is a matter for regret that the author omits to state that the smallest of the pygmy trees, such as the bun- or ball-shaped forms of *Chamaecyparis obtusa, C. pisifera, Cryptomeria japonica* var. *knaptonensis* and others of the same *genre*, are shallow rooting, and consequently cannot tolerate full sun. These, if they are to be maintained in perfect condition, demand a cool, moist soil and semi-shade. During such weather as we experienced last winter it is also necessary to provide overhead shelter for the first-named varieties, for long periods of wet weather, or frost following immediately after rain bring about many fatalities.

Mr. Hornibrook very wisely emphasizes again and again the great importance of obtaining the trees on their own roots in order to preserve their dwarf character. His pungent remark regarding the "uninformed public" who demands "a nice strong plant—and gets it" will hit home with a good many of us, especially when we see our so-called "dwarfs" sending up spring growth a foot or even more in length!

There is much helpful information regarding propagation, and this, no doubt, will encourage those who have not already tried raising specimens from cuttings to make the attempt. Many amateurs hold the mistaken idea that the striking of Conifer cuttings is a matter of the utmost difficulty, whereas patience and normal care are actually all that are required.

Mr. Hornibrook's account of the finding or rediscovery of many of the rarer specimens makes very interesting reading, and the photograph of the immense "Witches' broom" or "Hexenbesen" on *Pseudotsuga Douglasii* at Ottershaw, which is now included for the first time, is of special interest to the reviewer, who, for some years past, has assumed the responsibility of periodical cleaning and spraying the curiosity, which at one time was seriously attacked by Chermes.

In a work of this type errors are no doubt inevitable, but it is a little surprising that such slips as "Reginald Farrar," "Loudoun," "Schroter," as well as several small botanical technicalities should have escaped the notice of the proof reader. But these, after all, are minor flaws. The book is a real achievement, and Mr. Hornibrook is to be congratulated on a very fine piece of work which will be regarded as the standard work on the subject for many years to come.

GWENDOLYN ANLEY.

"Country Life Flower Calendar in Colour." 4to. 12 pp. Ill. (Country Life, London, 1939.) 3*s* 6*d*.

A series of twelve coloured illustrations from colour photographs by Blanche Henery of flowers appropriate to the months.

"Commercial Fruit Tree Spraying: Methods and Costs." By J Turnbull. M. of A. Bull. 5. Ed. 4. 8vo. v + 76 pp. Ill. (H.M. Stationery Office, London, 1939.) Paper covers 1*s*. 6*d*.

This excellent pamphlet on spraying in commercial orchards has been brought up to date, both as regards machinery for spraying and the materials for use for different kinds of fruit. Details of various types of machines and nozzles with comparative costs of work done are given and provide very valuable information for the commercial grower. It seems most economical to use a hand-power sprayer for areas up to 3 acres of apples or 6 acres of plums or bush fruits, but above this a power sprayer, the power increasing with the amount of spraying to be done and the number of men available. For 12,000 gallons of spray per annum (say 12 acres of apples) a 1½ h.p. power sprayer may suffice.

"Grapes, Peaches, Nectarines and Melons." By J. Lansdell. Rev. by A. J. Macself. 8vo. 144 pp. Ill. (Collingridge, London [1939].) 5*s*.

This revised edition, composed of twenty-one chapters, is well written in simple, non-technical language, and in no way falls below the level of the general high standard of its predecessors on this subject. Each chapter provides a really adequate help and guidance to both the student gardener and the amateur alike.

After giving a short history of the Vine, the author goes on to deal with the construction of the vinery, *i.e.* lean-to, three-quarter-span, and span-roof, heating arrangements, etc., emphasizing the mistakes made by an insufficient amount of hot water piping, its effect and the extra cost in fuel; roof angles are described and suitably illustrated.

Then follow chapters on Vine Borders, *i.e.* the natural border and the artificial border, and the planting of Vines, both young stock produced at home and bought-in Vines.

The account of subsequent management throughout the growing period is sound in every way and clearly defined, and deals with disbudding, stopping, tying and thinning, temperatures, feeding, and various pests and remedies, watering and ventilation. Winter treatment, as to time of pruning, cleaning and border renovation of old and sickly Vines is also fully dealt with.

Chapter VIII refers to Vines in a mixed house, associated with flowering plants and tomatos, difficulties attending this and caution necessary with a call for scrupulous cleanliness—and there is a useful paragraph on "Vines in unheated houses" with the usual practical advice, and a word about protection in spring and autumn during frosty nights.

Chapter X is devoted to "Vines in Pots"—early forcing and general management, and various methods of propagation.

A selection of varieties of Grapes, noting those suitable for unheated houses, and a few hardy varieties for outdoor growing, with a brief description of each.

Chapter XIV deals briefly with "Grape growers' troubles," and offers good advice regarding the bleeding of Vines owing to too late pruning, over-cropping and over-feeding, and the causes of shanking and how to combat them.

Exhibiting and packing for market are also described, and then follows a "Year's work among Vines," arranged under the months.

A brief history of the Peach and Nectarine is followed by some sound advice on heated and unheated structures, fittings, soils, planting, disbudding, training and pruning, fruit thinning and gathering—a short account of pot-cultivation which ably covers all important points for successful cultivation, followed by a list of varieties with notes on diseases and remedies.

" Outdoor Culture " is effectively dealt with, and there is a list appended of both Peaches and Nectarines, briefly described, suitable for warm and sheltered districts, concluding with a diary of the year's work.

A chapter on Melons is written on most practical lines and covers the procedure of general cultivation in a most satisfactory way.

This book is confidently recommended.

A. W. METCALFE.

" Practical Lawn Craft." By R. B. Dawson. With a foreword by Sir R. G. Stapledon. 8vo. 300 pp. Ill (Crosby, Lockwood, London, 1939.) 15s.

Interest in turf culture is world-wide, and in view of the many conflicting opinions expressed to-day on lawn upkeep, the value of this treatise, which is based not on supposition but on very careful experiments made by the author and his colleagues at the Board of Greenkeeping Research Station, St. Ives, need hardly be emphasized.

Its scope is well outlined by Sir R. G. Stapledon who, in his foreword, very justly affirms: " Mr. Dawson has written a most valuable and exhaustive book on the subject of turf, covering the whole field from golf to cricket, from cricket to football, and including polo grounds, racecourses and aerodromes. Every one of these makes demands on turf different from the other. . . .

" Lawns and lawn games are of the very essence of Britain and of the British peoples, and now that the numbers who actually enjoy, as well as those who watch such games, is rapidly increasing, there could be no more opportune book than this. It is, in fact, a worthy book on a worthy subject and one of real national importance."

Among other interesting points with which this book deals is the growing realization of the significance of " strain " in the grasses used for turf; the desirability of purchasing by name the ingredients of seed mixtures if value for money is to be obtained; comparisons of the " real value " of seed mixtures in relation to the price, and the advantages of pre-treatment of the soil with quick acting fertilisers before sowing a lawn.

The book is well arranged and well printed It contains a number of excellent illustrations which include photographs showing the effect of various experiments on lawns, methods of weed eradication, insect and fungus pests which attack turf, as well as examples of the latest rollers, mowers and other implements used for turf maintenance.

An appendix gives tables showing the composition of fertilizers, and diagrams with the correct measurements for marking out the ground for some of the most popular games.

J. E. GRANT WHITE.

NOTES AND ABSTRACTS.

Anemone biflora DC. By J. R. Sealy (*Bot Mag.* t. 9551; Mar. 1939).—A species from Persia, Turkestan, Afghanistan and Baluchistan, up to 5 inches high, with crimson persistent sepals which finally turn green and fold in to cover the stamens and carpels. A good plant for the alpine house.—*M. S.*

Ania Hookeriana (King & Pantl.) Tang & Wang. By V. S. Summerhayes (*Bot. Mag.* t. 9553 ; Mar. 1939).—The genus Ania is here upheld as distinct from Tainia, in which it was included by J. D. Hooker. Ridley in 1907 recognized the distinction but erroneously chose the name Ascotainia for the group, overlooking Lindley's previous name of Ania.

A plant from Sikkim and northern Siam, for the intermediate house, with ovoid greyish-green pseudobulbs up to 3 inches high, and racemes of ten to twenty-five yellow and brownish flowers. Plant about 3 feet high.—*M. S.*

Arisaema candidissimum W. W. Sm. By J. R. Sealy (*Bot. Mag.* t. 9549 ; Mar. 1939) —A hardy species from Yunnan and Szechwan, 12 to 42 inches high, with a single tri-lobed leaf, a galeate long-acuminate pure white to white flushed pale rose spathe, and a green tapered spadix.—*M. S.*

Callitris oblonga L. C. Richard. By R. Melville (*Bot. Mag.* t. 9550 ; Mar. 1939) —A coniferous bush or small tree from Tasmania, occasionally reaching 26 feet in height, but rarely exceeding 6½ feet. Branchlets slender, bearing at their tips small yellow male cones in twos or fours ; female cones green and inconspicuous.

A rather tender species rare in cultivation in Great Britain.—*M. S.*

Campanula incurva Auch. By E. Milne-Redhead (*Bot. Mag.* t. 9556 ; Mar. 1939).—A hardy perennial from Greece up to 18 inches tall with large pale violet or mauve campanulate flowers and sub-deltoid, cordate, hirsute leaves. Closely related to *Campanula lanata* but lacking the white hairs on the leaves, and with the appendages between the calyx lobes as long as or longer than the calyx tube.—*M. S.*

Cotoneaster conspicua Comber. By C. V. B. Marquand (*Bot. Mag* t. 9554 ; Mar 1939).—A hardy shrub up to 5 feet high with white flowers succeeded by a profusion of bright scarlet berries larger than in *Cotoneaster microphylla*. This, and its prostrate var. *decora*, are very desirable shrubs.

Discovered and collected in south-eastern Tibet in 1924.—*M. S.*

Dracocephalum Hemsleyanum (Oliver) Prain. By H. K. Airy Shaw (*Bot. Mag.* t. 9547 ; Mar. 1939).—A hardy herbaceous plant from south-east Tibet distinguished from near relatives by its entire leaves and hairy anthers. See JOURNAL R.H.S., **63**, p. 399.—*M. S.*

Hepaticas, Japanese. By T. Nakai (*Journ. Jap. Bot.*, xiii., pp. 227–243, 305–314 ; illust. ; Tokyo, 1937).—This paper deals with the Anemones of Far Eastern Asia previously referred to "*Anemone Hepatica* L." The author keeps Hepatica as a genus distinct from Anemone and finds no forms in Japan or Korea agreeing exactly with the European *Hepatica nobilis* (*Anemone Hepatica, Hepatica triloba*) or the American *H. acutiloba*. He distinguishes four species and several varieties :—*H. asiatica*, sp. nov., native to Korea and Manchuria, producing flowers before leaves, with leaves 2·5–9·5 cm. (usually 6–7 cm.) wide and perishing in autumn, sepals seven to eleven, 12–14 mm. long, ovaries and achenes hairy, the achenes 4 mm. long ; *H. insularis*, sp. nov., native to Quelpaert and other isles off Korea, producing flowers and leaves together, with leaves 1·5–5 cm. (usually 2·5–4·5 cm.) wide and perishing in autumn, sepals five, 9–10 mm.

long, ovaries and achenes hairy, the achenes 2–2·5 mm. long; *H. maxima* (*Anemone maxima*), native to Dagelet (Matsushima) island east of Korea, producing flowers and leaves together, with leaves 8–15 cm. (usually 10–12 cm.) wide and persisting all winter, the three lobes being very rounded, involucral segments 10–25 mm. long, 6–20 mm. wide, ovaries and achenes quite glabrous, the achenes 5–6 mm. long; *H. nobilis*, divided into vars. *japonica*, native to Kyushu and south Honshu, and *nipponica*, native to middle and north Honshu, producing flowers before leaves, with leaves 2·5–7·5 cm. wide and persisting all winter, involucral segments 4–10 mm. long, 2·5–6 mm. wide, ovaries and achenes hairy, the achenes 3–4 mm. long. Their flowers are pink or violet. *H. maxima* is the most distinct. The section Angulosa is not native to Japan but includes *H. transsilvanica* [*Bot. Mag.*, t. 5518, as "*Anemone angulosa*"; the original *A. angulosa* Lamarck, as pointed out in *Mag. Bot. Lapok*, vii, pp. 146–151 (1883), and *Wiener illust. Gartenzeitung*, xxi., 351 (1896), was described from a flower of *Hepatica nobilis* and a leaf of *Cortusa Matthioli* accidentally put together on an herbarium sheet and so has nothing to do with the "*A. angulosa*" of gardens !], *H. Falconeri*, *H. Henryi* and *H. Yamatutai*, sp. nov., described from a specimen without flower or fruit collected on Mt. Omi, prov. Szechwan, China. The leaf of *H. Yamatutai* has a hairy petiole 10–12 cm. long and a blade 2·5–3·5 cm. long, 5·2–6·7 cm. wide, sparsely hairy above and below, deeply divided into three pointed lobes, the middle lobe having a bulge or slight rounded tooth on both margins and the side-lobes a distinct rounded tooth on their outer margins.
W. T. S.

Prunus mira Koehne. By J. R. Sealy (*Bot. Mag.* t. 9548; Mar. 1939)—A peach native in western Szechwan distinguished by its smooth stone, the villose midrib, and the thinly woolly margins of its sepals. A hardy tree up to 12½ feet tall producing white flushed pale pink flowers in March and April before the leaves appear.—*M. S.*

Rhododendron Elliottii Watt. By J. Hutchinson (*Bot. Mag.* t. 9546; Mar 1939).—A notable species of the Irroratum series from Assam, making a large bush or small tree with splendid, deep red, spotted, tubular-funnel-shaped flowers. Somewhat tender but now used considerably in hybridization —*M. S.*

Romulea Requienii Parl. By W. B. Turrill (*Bot. Mag.* t. 9555; Mar. 1939). A species native in Corsica, Sardinia, and neighbouring islets, about 5 inches high, with purple-violet flowers and long linear leaves. Requires protection against severe wet and cold.—*M. S.*

Solanum valdiviense Dun. By N. Y. Sandwith (*Bot. Mag.* t. 9552; Mar. 1939).—A hardy shrub from Chile and Argentina up to 3 feet 9 inches high, bearing umbel-like corymbs of dirty-white to mauve flowers.—*M.S.*

Tristan da Cunha, Plants of. By Erling Christophersen (*Det Norske Videnskaps-Akaderai; Oslo. Sci. Res. Norw. Antarc. Exp.* 1927–28 *et seq.*, No. 16; 19 pp. Oslo, 1937).—Tristan da Cunha, midway between Cape Colony and South America, was first visited by a botanist (Aubert du Petit-Thovars) in 1793, next by Dugald Carmichael in 1816 and since then by about six other botanists. At present 186 species and 5 varieties of plants are known from the Tristan da Cunha group, not including Gough Island. Of these 74 species and 4 varieties are flowering plants, 30 species and 1 variety ferns and lycopodiums, 38 species mosses, 11 species liverworts, 12 species lichens, 2 species fungi and 19 algae. Ten or 11 species and 3 varieties (belonging to Phalaris, Polypogon, Carex, Scirpus, Atriplex, Cardamine, Hydrocotyle, Nertera and Cotula) are endemic. None appears to be of garden value. This paper lists all the species and varieties known and gives a guide to the literature on these islands.—*W. T. S.*

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FORTHCOMING EVENTS.

IN the August number of the JOURNAL Fellows' attention was drawn to several changes that are taking place on the staff of the Society, namely, that Mr. F. J Chittenden is taking over, from October 1, the Editorship of the Royal Horticultural Society's Dictionary of Gardening, and in that position he will give up the posts of Keeper of the Library, Technical Adviser and Editor of the Society's publications, to devote his time to the new work.

Mr. E. A. Bunyard has been appointed the Editor of the Society's publications and Keeper of the Library, and as such has retired from the Council, but at the same time he is remaining a Director of his firm.

From October 1 all requests for horticultural advice, advice on diseases, soils and manures, and for the identification of plants should be addressed to the Director of the R.H.S. Gardens, Wisley, nr. Ripley, Surrey. Any fruits for naming should be sent to the Secretary, R.H.S. Offices, Vincent Square, S.W. 1. Fellows and Associates are reminded of the following rules for sending plants or fruits for identification :

1. Send a good strong piece, bearing leaves and at least three blossoms. Cut the flowers in the bud stage or they will be over before they arrive. It is rarely possible and never wise to name a plant from its leaf alone, and poor specimens with only one blossom make identification unnecessarily difficult.

2. Wrap in soft paper and then pack in moss or even damp grass. Do not use cotton wool. Specimens should not be pressed.

3. Give all the information you can respecting the specimens, including the size of the plant and the country of origin or natural habitat, if known. With a garden plant, say where it is growing. greenhouse or open, sun or shade, etc.

4. Of **Fruits**, send at least three perfect specimens of a variety. Do not send until fruits are mature, and then choose specimens representative of the particular variety. Avoid sending bruised, diseased or abnormal fruits. Include with each variety a typical shoot with foliage. In the case of apples and pears, number each variety, preferably in Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper and pack it carefully and securely in wood-wool or similar material. Cardboard boxes are usually crushed in the post, while scented soap boxes taint the fruit and obscure the characteristic flavour. Give all the information you can respecting the age of the trees and how they are grown, *e.g.* indoors or out, as cordons, bushes or standards, etc.

5. It is a convenience if specimens of fruits are sent so as to reach the office on the day preceding a Show, as it is then possible to enlist the services of the experts on the Committee.

It was further reported in the August JOURNAL that Mr. Vine, who was the Society's Garden Inspector, was retiring, and that Mr. James Wilson, recently head gardener to the late Sir Philip Sassoon, had been appointed to take his place.

Arrangements for garden inspection will continue as heretofore.

Mr. Wilson will be in attendance at the Fortnightly Shows, on the dais in the New Hall, from 2 P.M. onwards, to answer questions on general gardening matters, giving the same assistance and advice that Mr. Vine had been accustomed to do.

SUBSCRIPTIONS.

Fellows and Associates are reminded that if they have any friends now desiring to join the Society, a full year's subscription, paid on October 1, entitles them to all the privileges of Fellowship until January 1, 1941; back numbers of the Society's JOURNAL are obtainable by Fellows and Associates at 9*d.* a number.

GREAT AUTUMN FLOWER SHOW.

The Great Autumn Flower Show will be held in Earls Court Exhibition Hall (entrance Warwick Road) this year on September 13, 14 and 15.

Fellows and Associates will be admitted on presentation of their tickets at the hours stated below, and the prices of admission for non-Fellows will be:

		s.	*d.*
Wednesday, September 13,	11 A.M. to 2 P.M. . . .	10	0
	2 P.M. to 6 P.M. . . .	5	0
	6 P.M. to 9.30 P.M. . .	2	6
Thursday, September 14,	10 A.M. to 6 P.M. . . .	2	6
	6 P.M. to 9.30 P.M. . .	1	0
Friday, September 15,	10 A.M. to 5 P.M. . . .	1	0

Two Challenge Cups will be competed for at the Autumn Show: the Coronation Cup, which is offered for the best exhibit at the Show, and the Wigan Cup, which is offered for the best exhibit of Roses. There will also be a Flower Arrangement Competition, particulars of which have appeared in the Daily and the Gardening Press.

BATH CHAIRS.

Under the regulations of the London County Council no invalid or wheel chairs of any kind can be permitted.

CALENDAR.

The National Chrysanthemum Society will hold its Early-flowering Chrysanthemum Show on September 19 (1 to 7.30 P.M.) and 20 (10 A.M. to 5 P.M.).

A Fortnightly Show will be held on September 26 (12 noon to 7.30 P.M.) and 27 (10 A.M. to 5 P.M.), and on this occasion a silver trophy, provided from Mrs. Sherman Hoyt's Prize Fund, is offered for the best group of cacti and/or succulents staged by an amateur. This competition was to have been held on September 13 and 14, but owing to the Great Autumn Show, it had to be postponed.

On September 26, at 3.30 P.M., in the Lecture Room, Mr. E. R. Janes will give a lecture on "Sweet Peas."

The talk on "Some plants in the Show" will be given by Mrs. V. Higgins at 3.30 P.M. on September 27

On September 29 (2.30 to 9 P.M.) and 30 (10 A.M. to 6.30 P.M.) the London Gardens Society will hold its show in the New Hall.

Entries for the Fruit and Vegetable Show, to be held on October 10 and 11, must be received by the Secretary not later than by the first post on Wednesday, October 4.

A Fortnightly Show will be held on October 10 (12 noon to 7.30 P.M.) and 11 (10 A.M. to 4 P.M.) in the New Hall.

In the Old Hall on October 10 (1 to 7.30 P.M.) and 11 (10 A.M. to 4 P.M.) the Fruit and Vegetable Show will be held. At this Show there will be a special exhibit from Wisley of Pests and Diseases of Fruits and Vegetables. Schedules can be obtained from the Secretary.

At 3.30 P.M. on October 10 a lecture on "The Timing of Vegetable Crops" will be given by Mr. F. Streeter.

A Fortnightly Show will take place on October 24 (12 noon to 7.30 P.M.) and 25 (10 A.M. to 4 P.M.). It is usual on this occasion to find Berried Shrubs, Orchids, Stove and Greenhouse Plants well represented.

The following Orchid competitions will take place on October 24 for Trophies presented by the Orchid Trade:

(*a*) A Silver Trophy for the best twelve orchids, not more than two of any one genus, exhibited by an amateur who employs not more than two growers, including the head gardener, in his orchid houses.

(*b*) A Silver Trophy for the best six orchids exhibited by an amateur who employs not more than one orchid grower or gardener.

Entries must be made on special forms obtainable from the Secretary, to whom the completed forms should be returned not later than by the first post on Wednesday, October 18.

At 3.30 P.M. in the Lecture Room on October 24, Mr. G. C. Taylor will lecture on "The Modern Garden."

A Lily Group discussion will take place at 4.30 P.M., in the Restaurant of the Old Hall, on October 24 on "Plants to associate with Lilies."

The Presidential Address of the Institute of Landscape Architects will be given at 3 P.M. on October 25 in the Lecture Room of the New Hall. Fellows interested are invited to attend.

The British Carnation Society will hold its show in the Old Hall on October 24 (1 to 7.30 P.M.) and 25 (10 A.M. to 5 P.M.).

LECTURES.

It will be remembered, with the late decision of holding the Autumn Show, that certain changes in the calendar, as printed on the tickets and elsewhere, have had to be made, especially in respect to lectures.

The lecture on "The Modern Garden" by Mr G. C. Taylor, which was to be given on September 12, has to be postponed owing to the Autumn Show, but Mr. Balls, who was to have lectured on "Plant Hunting in Mexico" on October 24, is unable to give his lecture as he will still be away on his expedition, and so Mr. Taylor has kindly consented to give his lecture on October 24.

COMPETITION FOR CACTI AND SUCCULENTS.

It should be noted that the Competition for Cacti and Succulents, which was to be held on September 12 and 13, will now be held on September 26 and 27, owing to the Autumn Show.

BRITISH FLORAL ART DIPLOMA.

The practical examinations for the British Floral Art Diploma will take place on Thursday and Friday, September 21 and 22, and on the afternoon of Friday from 2 to 5 o'clock the designs made by the candidates will be open for inspection by Fellows in the Old Hall.

PICTURES, PLANS, PHOTOGRAPHS, ETC.

With the approach of winter, space will be available at Fortnightly Shows for pictures and photographs of plants, flowers and gardens, and for plans or models of gardens. Regulations with regard to these exhibits may be had on application to the Secretary. The dates of the Shows when these exhibits are permitted are November 7 and 28, and December 12, 1939, January 9 and 23, and February 9, 1940.

HORTICULTURAL SUNDRIES.

The exhibition of Horticultural Sundries will be allowed at the Fortnightly Shows in December and January. If space is available sundries will also be admitted on November 28.

HALL LETTINGS. (Fellows' tickets do not admit.)

From September 8 to 16 the Model Engineering Exhibition will be held in the Society's Old Hall. Anyone interested in the exhibition is asked to apply to the organizers, Messrs. P. Marshall & Co., Ltd., 13/16 Fisher Street, W.C. 1.

On September 22 and 23 the National Rose Society will hold its show in the New Hall. For further particulars apply to the Secretary of the National Rose Society, Courtney Page, Esq., 117 Victoria Street, S.W. 1.

From October 16 to 20 the Medical Exhibition will be held in the New Hall, and interested persons are asked to apply to the organizer, R. S. Ely, Esq., The British and Colonial Druggist, Ltd., 194-200 Bishopsgate, E.C. 2.

IMPERIAL FRUIT SHOW.

The Imperial Fruit Show is to be held in the Old and New Halls from November 13 to November 18, and Fellows are cordially invited by the organizers to pay it a visit. Their tickets will admit them free. It will be open from 2.30 to 10 P.M. on Monday, November 13, and from 11 A.M to 10 P.M. on the other days.

The Show is designed to demonstrate the range and quality of fruits produced at home and in the Dominions and the Colonies. Great Britain, Canada, India, Australia, South Africa, Northern Ireland, the Colonial Empire Marketing Board and the Ministry of Agriculture will each stage important exhibits. It was last held in London in 1926, since when there have been important developments in production and marketing.

THE LONDON CHILDREN'S GARDEN FUND.

The Society has for many years subscribed to this Fund which enables children in the crowded parts of London to become gardeners in a small way by hiring or loaning derelict land and putting it, as far as may be, into gardening condition.

Vegetables are naturally of the chief importance, and spinach is very popular and thrives in what would be considered in the country very unfavourable conditions.

Onions and salad vegetables, carrots and dwarf beans are the main varieties; one garden alone produced over fifty thousand carrots last year.

Flowers have a wider range and the Pot Marigold stands up to all conditions, even a compost of ashes and brickbats.

Eschscholzias, and annual Larkspurs (often self-sown) predominate, but most of the better known annuals will make some show.

In the Canning Town Garden, surrounded by gas-works as they are, vegetables, and especially cabbages, grow well, and also many annuals and the unconquerable Michaelmas Daisy.

In the Isle of Dogs Garden several gay borders of herbaceous plants and annuals are notable.

A tribute must be paid to the vitality of the young gardeners and to the Society and its officials who are so valiantly facing difficulties of many kinds, and we are glad to know that the annual visits of the Royal Horticultural Society's representatives are an encouragement to this work.

WISLEY IN SEPTEMBER.

With the first month of autumn comes also a change in the character of the floral attractions of the Gardens, when such fine late summer and early autumn flowers as the Dahlias, Michaelmas Daisies, Early-flowering Chrysanthemums, Montbretias, Colchicums and Lobelias are at their peak, whilst the shrubs begin to don their final colourings before leaf-fall and berries to become red, orange, black or the various other tints denoting the ripe stage they have attained.

Besides those mentioned, the trials and collections also include the annual Dimorphothecas, late-flowering Callistephus (China Asters), and Godetias, Roses, Heliotropes, forms of *Viola cornuta*, of *Scabiosa caucasica*, and *Fuchsia magellanica*, and other species and varieties growing in close proximity to the main Rose walk leading from the entrance gates.

Further up the hill in the beds beside the Alpine house are varieties of Gazanias, remarkable for their brilliant red, orange, or yellow hues, although, unfortunately, not sufficiently hardy to survive the winter out of doors. Within the Alpine house such plants as *Campanula cashmiriana*, *Crassula Cooperi*, species of Allium, *Silene cypria*, and Wahlenbergias still remain in flower. On the Rock Garden are a number of late-flowering plants such as Cyananthus species, including *Cyananthus integer*, *C. incanus* and *C. pedunculatus* var. *crenatus*, all with blue or lavender Periwinkle-like blooms, besides the late-flowering Gentians, of which *Gentiana Farreri* and its several hybrids are examples, species of Aster, *Cautleya spicata*, *Roscoea purpurea* var. *pallida*, *Satureia montana*, and the scarlet *Zauschneria californica*. At the end of the month the brilliant *Gentiana sino-ornata* adds its rich blue trumpets to the collection, and will also be found in the Wild Garden and Azalea Garden. In the former, *Cyclamen neapolitanum* is a feature beneath the trees where it has been long established and annually produces its pale pink or white flowers on slender stalks before the leaves appear.

The Heath Garden at this time of the year is a particularly bright part of Wisley, when not only are the numerous varieties of the common Ling (*Calluna vulgaris*) at their gayest, but supporting them are the later forms of *Erica cinerea* such as 'Eden Valley,' of *E. vagans*, the Cornish Heath, especially 'St. Keverne,' and the excellent hybrids *Watsonii* and 'Dawn.' Excepting for the month of March the Heaths have no more decorative period than the earlier part of September, and should therefore not be overlooked by visitors.

Among the shrubs in Seven Acres colour is provided by the Dogwoods (Cornus), of which *Cornus alba* is an example, *Ribes americanum* and *R. aureum, Hypericum patulum, Acer circinatum,* and *Berberis virescens*, while the berries of the Berberis family begin to turn red, pink or purple as their habit may be.

Those who are interested should here make a divergence to the path beside the river and walk along to the collection of Rosa species in Howard's Field, where they will find many of their fruits already coloured and offering a wide choice for decorative purposes.

The herbaceous border is of course one of the chief centres of interest at the moment, as it has been since late July, and includes clumps of the crimson or scarlet hybrids of *Lobelia fulgens*, of *Aster acris, Rudbeckia* sp., *Eupatorium purpureum, Verbena bonariensis, Helianthus mollis*, and a large assortment of other suitable and ornamental plants for this important part of the modern garden.

In the Award of Merit Garden three first-class plants now in flower are *Aster Amellus* 'King George,' *Perowskia atriplicifolia* with grey leaves and lavender spikes of small flowers, and 'Black-Eyed Susan,' *Rudbeckia speciosa*—rich yellow with a dark eye. The hybrids of *Colchicum speciosum* previously mentioned will be seen in the Azalea Garden among the collection of Viburnum species, and here also are large groups of Crinums, useful hardy border plants for the end of summer with pink or white Lily-like blooms borne in umbels.

Coming to the glasshouses we notice in the Temperate house that the pale blue *Plumbago capensis*, together with the fragrant *Stephanotis floribunda* and the long-lasting Fuchsia hybrids are flowering, whilst *Dianella caerulea* bears its bright blue berries on slender stems. In the Half-hardy house *Aster Pappei* continues to flourish its light blue Daisies and the collection of Nerine hybrids is beginning to flower freely. *Limonium roseum* is an uncommon sub-shrubby species with delicate pink sprays of blossom.

On the way out several shrubs on the west wall of the Laboratory will draw attention, notably the Pomegranate, *Punica Granatum*, the pendent white bells of *Tricuspidaria dependens*, and finally the quantity of white flowers borne by *Escallonia montevidensis* in an angle of the wall.

SALADS AND SALAD-MAKING.

By AMBROSE HEATH.

[Read April 13, 1939; Mr. E. A. BUNYARD, F.L.S., in the Chair.]

WHEN I began to think about this lecture, I wondered whether I would tell you something about the history of salads, or just talk to you about salad-making. But when I began to write out my lecture, it sounded so dull and formal that I thought it would be best if I were just to talk to you about the simple things in salad-making which I have found it is really necessary to know.

The old English salads were always very elaborate, I think. They were full of herbs of all sorts, and the flavours must have been so mixed that you could hardly distinguish anything. Old English cooking was very much the same. They used herbs in enormous quantities and often quite indiscriminately, possibly because the meat was inferior, and they wanted to disguise its true flavour! In a book of salads I was looking at the other day I found one old salad which contained thirty-five different herbs! I doubt if it would be worth eating, even if we could procure all its ingredients to-day.

The Salmagundy of the 17th and 18th centuries was an elaborate salad of this kind, often with meat and fish in it (perhaps it was the forerunner of our modern *hors-d'œuvre*), and great care and trouble was taken to make a "set-piece" of it. Here is one described by the celebrated Mrs. GLASSE:

'*To make Salamongundy.*—Take two or three Roman or cabbage lettuces, and when you have washed them clean, swing them pretty dry in a cloth; then beginning at the open end, cut them crossways, as fine as a good big thread, and lay the lettuces so cut, about an inch thick, all over the bottom of a dish. When you have thus garnished your dish, take two roasted pullets or chickens, and cut the flesh off the breasts and wings into slices, about three inches long, a quarter of an inch broad, and as thin as a shilling: lay them upon the lettuce round the end to the middle of the dish, and the other towards the brim; then having boned and cut six anchovies, each into eight pieces, lay them all between each slice of the fowls, then cut the lean meat off the legs into dice, and cut a lemon into small dice; then mince the yolks of four eggs, three or four anchovies, and a little parsley, and make a round heap of these in your dish, piling it up in the form of a sugar-loaf, and garnish it with onions, as big as the yolks of eggs, boiled in a good deal of water, very soft and white. Put the largest of the onions in the middle on top of the salamongundy, and lay the rest round the brim of the dish, as thick as you can lay them; then beat some salad oil with vinegar, salt and pepper, and pour it over all.

Garnish with grapes just scalded, or French beans blanched, or Nastertion-flowers, and serve it up for a first course.'

The present-day salad, as we know it, is really very simple, and probably dates from the days of the French Revolution when a great many of the French nobility escaped and came over here. To make a living, many of them went round dressing salads for the rich people in England; and they got well paid for it. Simplicity in salads was encouraged again during the Great War when the Belgian refugees came over and demanded salads which English people had never seen before. I was told rather an interesting thing the other day about that. Nowadays cabbage lettuces seem very much more common than Cos lettuces. When I was a young man Cos lettuces seemed to be the thing, but now it is almost difficult to get them. A grower was telling me the other day this was due to the War and the refugees coming over here; they were not used to eating Cos lettuces, and they wanted cabbage lettuces, and so they started a fashion which has persisted.

Well now we have got down to our lettuce at last. The prime consideration, I consider, in a salad of lettuce is that it should be as fresh as possible. Most of us are not able to grow lettuces, but of course the ideal way is to go into the garden, pick it and eat it, if possible, without washing it at all. All the same we can get lettuces from the British growers who are holding this Exhibition to-day much fresher than we have ever done before, and we can at last begin to obtain salads which are worthy to be eaten. We cannot all have our lettuce just as it is grown, picked straight from the garden and eaten as it is—and so you will have to wash it. If you have to wash it, you must dry it. If you do not dry it you get into difficulties; for the salad may be floating in water. To dry it, the best thing to do is what the French people do. You go outside the back door, put the lettuce in a little wire basket, and swing it madly round and round until all the particles of water fly off in the air. Do not do this, by the way, indoors! If it is not dry then, you can dry it still further in a cloth, in which you can also hang it up for a while and it will remain crisp.

There is another thing which people nowadays forget. If you look at an American cookery book you will find all their salads are chilled. I do not know enough about refrigeration to say whether it really seriously affects the nutritive properties of the lettuce, but it certainly does not spoil its flavour, and makes it more crisp and more attractive. There are two salads here which, by the kindness of the Countess of Leconfield, came from Petworth House this morning. Actually they were made yesterday and kept in a refrigerator all night. I do not think they have suffered very much.

I need not tell you that you should not cut lettuce up. At least not with a steel knife, and even a silver one or stainless steel sometimes browns the edges of the leaves. I think one of the troubles of my bowl of lettuce-soup stuff I was telling you about at the beginning of this talk was that it had all been cut up into little shreds and the edge of the lettuce was brown and unpleasant to look at; you should pick lettuce to pieces with your hand, and you will find it very much nicer. But do not throw away the outside leaves. There is a use for these which I will explain later.

You have now got your salad picked to pieces and dried. What are you to do with it? I ought to say first, perhaps, that, in the case of a lettuce like a Cos lettuce when it is very young, I think there is nothing better if it is really fresh than to eat it just as it is with perhaps a little salt. I think it is perfect like that without dressing, but if you want to dress a salad, the simplest dressing is really the best. There must be two or three hundred different sorts of salad dressings, but nothing has yet been invented to beat the ordinary French dressing which is just vinegar, oil, and salt and pepper; in this country the oil should be in the proportion of two to one of vinegar; in France they use a little more oil, in Germany a little more vinegar. But two things must be remembered, one is that you must have olive oil and the other that you must have wine vinegar. About two years ago, in one of the articles I wrote for *The Manchester Guardian*, I very rashly mentioned wine vinegar about six times in the same article. The result was that I had a letter from an English vinegar manufacturer who was very upset. He wrote: " We make very good malt vinegar in England, why do you always say wine vinegar should be used? " It was really good malt vinegar he was talking about, not the synthetic vinegar which is made out of wood or something like that, and he took the trouble to send me six or seven samples of malt vinegar made by various refiners in this country, and they were very good indeed; but they were not wine vinegar, and they had not got the same flavour; they could not possibly have it because it was not the same thing. Our product is inclined to be too harsh, I think. It is a little difficult to insist on wine vinegar, however, because English people have always, I imagine, used malt vinegar more than wine vinegar, and it sounds a little affected to insist on wine vinegar, especially when one is always talking about French salads and French dressings. But there is no doubt in my own mind that wine vinegar is the thing to have. It is very little more expensive, and it is certainly very much better for the purpose.

The oil should certainly be olive oil. That is another point: salad oil should *taste* of olives. There is a much better oil than olive oil made from walnuts, which you can get in France, but it is difficult to get in this country. A great deal of " salad oil " is completely tasteless, and people say, " This must be awfully good oil; it does not taste of anything at all." But it is probably made of monkey nuts, and they have had to take all the taste out of it, otherwise you could not use it at all. Olive oil has a distinctive and pleasant flavour, and in my opinion the olive oil from Provence is the best one to use.

There is another thing that is important in salad-making: do not overdress your salad. It is much better to have too little dressing than too much. If you have too much, you get a lot of it in the bottom of the salad bowl. It does not matter very much whether you put on the oil first or the vinegar, or whether you mix them together, so long as you don't make a nuisance of mixing them. I remember once staying in an hotel by the sea, where there was an old lady who always insisted on making her salad dressing herself. She ate a salad at every meal, and as soon as one got into an interesting conversation this irritating tinkle of the spoon against the glass began, until it really became quite aggravating! It is quite unnecessary to do that. You can put the salt and pepper in the vinegar first and just sprinkle it over the lettuce—I am only talking about lettuce at the moment—then pour the oil over and simply mix the salad by lifting it up very delicately with a glass or bone or wooden spoon, so that it gets gradually mixed and glazed with the dressing; you do not need to toss it about; and this simple operation ought to be done at the last minute—just before you eat it, if possible. That of course is the ordinary dressing. You can vary it by adding a little mustard, and some people like a touch of sugar. It is entirely a matter of personal taste. I think mustard is a mistake myself, because everything should be attuned to the flavour of the lettuce, and you do not want to dissipate it more than you can possibly help. The dressing can be varied again for people with whom vinegar does not agree. You can use lemon juice or orange juice instead of vinegar. Chicory or endive salad is improved by the use of orange juice instead of vinegar. It seems to go specially well with these vegetables.

Then there is a quite a different dressing which is useful, not with lettuce but with salads like celeriac or celery. That is the cream dressing in which cream and lemon juice take the place of the oil and vinegar in exactly the same proportions, one third lemon juice and two-thirds cream, with salt and pepper. Here again you can add mustard with certain things, for example with celeriac. But it is very difficult to lay down hard and fast rules for these dressings, because they depend so much on personal taste and the kind of salad you are dressing.

There is one other point I should like to make, and that is the habit which French people have of using herbs to flavour salad. This salad on the table before me has been sprinkled, before it was dressed, with mixed herbs, what the French call *fines herbes*, which consists of chopped chervil, chives, tarragon and parsley. Instead of chives, you can use the green part of very young spring onions; but it is not quite the same thing, as chives have a rather more "garlicky" flavour than onions. If you sprinkle your salad with these *fines herbes* before you dress it, you will find that they give it a remarkable and delicious freshness. Chives are quite easy to grow, even in a window-box, but usually rather difficult to get in London, or even in the country unless you have got a garden or can beg or steal from your friends.

One other point, and that is about the onion. Someone rather wittily wrote somewhere that the English salad was the infancy of mixed pickle. I think the onion is probably a good deal to blame for that! It always is rather amusing—and perhaps a little horrifying—to see spring onions stuck up all round the outside of a salad. Really I think in a mixed salad onions are a little too strong, unless they are very, very small or cut in very fine shreds. In the same way I believe that to rub a salad-bowl with an onion is a mistake. I will, however, say a word in a moment about garlic, but that is another matter. Onions are better out of a salad than in it; if you must have them, the best thing to do is to eat them just as they are; they are much too strong for combination in a salad.

May I say one more thing? If you are mixing a salad, use a large bowl—as large as you can, so that you can get a good circulation. You may find that you are still overdressing your salad, or your leaves may not be quite dry through no fault of yours, or you may find at the bottom a little water or dressing; dress the salad in one bowl and then serve it in another. By the time you have moved it and lifted it up, what moisture there is will drop off and remain in the bottom of the first bowl.

Always use quite clean utensils for a salad. The Americans believe in having a salad bowl in the same condition as that in which people are told to keep their omelette pans. They do not like to wash it; they prefer it to get thoroughly impregnated—and it is usually a wooden bowl. That, I think, is a mistake, because it would be rather like eating something with a perpetual taste of onions. The lettuce should be quite clean and should not taste of anything extraneous. That is what I was thinking of, when I wanted just now to talk about garlic. I am very fond of garlic, and I am sure a great many people feel the same about it. Garlic used sparingly is delicious, and a great many dishes which people love to eat in restaurants have a special fascination for the ordinary person just because they have a touch of garlic in them. It has a kind of sex-appeal among vegetables which is quite indescribable. And garlic again is an ingredient which should not be used in a salad except in certain cases. I have before me some chicory — that, and the curly kind which we call endive, are the two things which seem to demand a very faint flavour of garlic, either by just rubbing the bowl with it before you make the salad, or by putting in, as they sometimes do in France, a crust of bread rubbed with garlic, called a *chapon,* at the bottom of the salad, leaving it there until the salad is served and then taking it out. I am not sure that the rubbing is not better, because the piece of bread sometimes gets too near to a few pieces of the salad and makes them taste too strong. While I am on the subject of garlic, the following story will be salutary and amusing too. There was a chef called FRANCATELLI at the Reform Club, who was often congratulated on the delicious flavour of his salads, and in spite of every persuasion he always refused to give up his secret. But one day at last somebody persuaded him to tell them about it, and he said—"I just chew a little bit of garlic, and I breathe on the salad—so."

I have come to the end of my notes, and am just wondering how I should talk to you about other salad vegetables. I had a list given to me of home-grown salads which were suitable to talk about, and I think it will be best to take these one by one, and make one or two suggestions which may be interesting.

The first one is radishes. I do not see what you can do with a radish except chop it up, or dress it with an ordinary dressing. It does not seem to be much good except to eat in railway trains or just by itself. They have, or used to have, extraordinarily good radishes on the Great Western Railway; and I had once a long correspondence with them about the sort of radishes they supplied, as I wanted to grow some myself.

Here is a suggestion for using radishes as a decoration. There is one amusing little thing in the matter which comes from America. If anybody wants to make a really decorative salad—and I should think a completely indigestible one too—cut some rather thick slices of cucumber, about three or four times as thick as usual, cut a small slit in the side of each and introduce a slice of radish. It is quite trivial; it is certainly quite pretty, and it is a use for radishes!

Next on my list come mustard and cress. What *can* you do with mustard and cress? I believe they are one of those social embarassments that somebody invented, or forced upon us—like spaghetti. It is one of the pitfalls of eating, unless you chop the stuff up. As a garnish on a salad, they are a kind of barbed wire entanglement. If anyone can tell me of a pleasant way in which to eat mustard and cress, I shall be grateful. Perhaps it can be cooked?

Watercress is a lovely thing, I think, but it does not combine very well with other saladings. We used to make watercress salad with orange on it, a kind of variant of lettuce and orange, and we ate it with wild duck, and it was very good. There is a watercress salad on the table before me which I am afraid does not look very nice because the dressing has got rather dry. This is a Salade Cressonière, a potato salad with just leaves of watercress in it—a very good mixture. Watercress makes a good salad by itself—just the leaves picked off and dressed with lemon juice and not vinegar.

Spring onions are my next note. I have not much to say about them because, as I said before, unless they are very young you cannot do very much with them.

The next is cucumber Everybody knows how to make cucumber digestible, and that is to cut it in slices, cover it with a lot of salt, leave it for an hour—and then, I think, the best thing to do is to throw it away, because it does not taste of anything: it has lost all its nice crispness. People who suffer from indigestion can eat cucumber that way if they like, but not I. In any case, sliced cucumber is rather dull. I would like to see it cut into small pieces—little cubes You will find at the end of the table a salad of cucumber dressed with sour cream which is a little different; and here it is cut in cubes instead of slices, which makes it more appetizing to look at, and less familiar. I am sure, by the way, that there is a great deal to be said for having salads, and other food, prepared a little differently from the usual, and it certainly adds to the cucumber's attraction if it is cut up in an unfamiliar way. You will also find it is useful to sprinkle cucumber with chopped young spring onions or chives or parsley, or with tarragon and chervil. There is one use for cucumber that comes from America and is useful at this time of year when we are all eating salmon when we can—if we can afford it! It is cucumber cut into small bits and mixed with Hollandaise sauce. It is rather attractive, the softness of the sauce and the hardness of the bits of cucumber, and I recommend its trial.

Next, tomatos. Always peel them, please, if you can. I find one of the most unpleasant things about salads with tomato is that the chef or cook will leave the skin on. It is quite unnecessary: you can peel them quite easily after plunging them in boiling water. When they are peeled, they are rather difficult and slimy to handle, but this is a chance for your refrigerator to shine. After they are peeled, just put them into it for a short time, and the outside will lose its sliminess, and you can cut the tomato up much more easily than if you were to try and operate on it when it is still partly warm. I heard of rather a good idea the other day, but I have not tested it yet. Everybody knows how difficult it is to put sliced tomato in a green salad without getting the tomato all over the place. (It is like beetroot and egg. Beetroot and egg should never appear together, because the beetroot juice gets on to the egg and stains it most unpleasantly.) The tomato idea was, if you want to have a mixed salad, to have the tomato dressed and handed separately. It is a good idea, because the wet part of the tomato does not get into the green salad. But the best thing to do is to treat the tomato in such a way that it does not exude all that juice. That is not only to peel it, but to get rid of the pips and the juice, and use the flesh alone. If that sounds rather extravagant you can always make tomato soup with the remains, plus one or two more tomatos. So nothing need really be wasted. If you are using tomatos as a salad by themselves, they demand a little chopped chives or onion. In America you get alternate slices of tomato and rings of raw onion. It is rather good, but very strong and coarse.

Here is a good way of treating tomatos which I can recommend. For it you will need a refrigerator. First of all, skin the tomatos, which should not be too large, scoop out most of the inside, and fill them up with a macédoine of vegetables, peas or a mixture of peas and French beans, moistened with mayonnaise sauce. Put the stuffed tomatos into the refrigerator until they get nice and hard, then take them out, cut them into quarters, and serve them as they are.

Then there is beetroot written down by itself here. Beetroot, by the way, is very good with horseradish grated on it. Another thing to remember is that beetroot does not really need a lot of vinegar: a little oil and hardly any vinegar at all, or lemon juice instead. Beetroot is used in one or two of the mixed salads which we have here. The salad called Lorette, for instance, has beetroot in it: beetroot, celery and corn salad or lamb's lettuce.

This one, too, a Salade Norvégienne, quite simple and pleasant, beetroot and pineapple. It smells like strawberry ice and tastes very good in spite of the odd mixture.

Then on my list comes lamb's lettuce, which is also called corn salad in this country, and mâche or doucette in France. I do not know whether I ought to talk about that, because I do not know whether it is grown commercially. It is extremely nice, and very useful in winter when lettuces are scarcer than they are now. It tastes a little of olives.

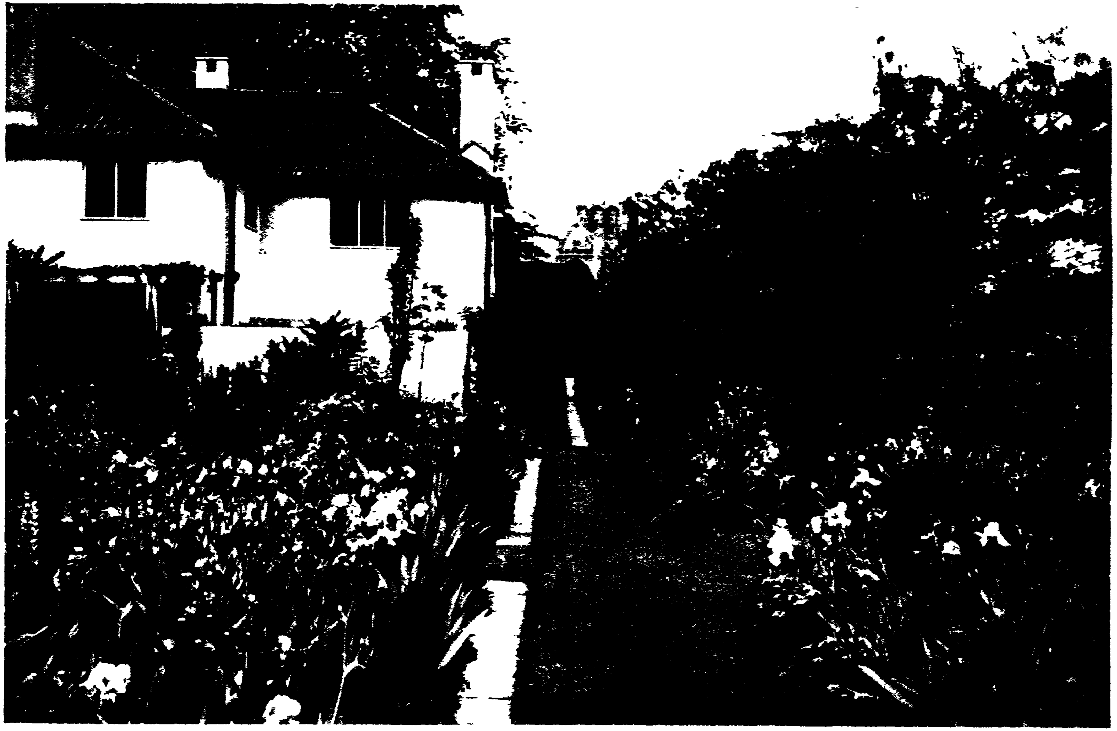
Celeriac is another thing which people do not use very much. It is not really a salad in the proper sense of the word, but it is useful when you cannot get celery. I expect you have seen it in shops, a large pale brownish root, very hard and unpleasant to look at, but when you cut it open it has a sort of rooty celery smell and a kind of nutty flavour, very attractive. It may be cooked like a vegetable, but usually it is cut into little strips, blanched in boiling water for about five minutes, and then dried and used in salad and dressed with cream dressing with a little mustard. Actually, of course, it is a member of the celery family which chooses to grow under rather than above ground.

There is another dish here that I want specially to mention. To-morrow there is a lunch at the Café Royal for this Exhibition of early produce, and they make a speciality of having a dish of hors-d'oeuvre made entirely of vegetables. I thought you might like to see it, because people in this country do not use hors-d'oeuvre very much as part of a meal. They are really very good especially in the summer time, when you do not want to eat very much, and they are quite easy to make and quite inexpensive. This dish is composed entirely of vegetables; I would like you to taste it afterwards. Here are cold fried artichoke chips and here is some rather nice broccoli and celeriac, and this is finocchio, which is also called Florence fennel. It grows like celery and tastes something like fennel, and has a sort of aniseed flavour. The whole dish is most interesting and gives you an idea of what you can do with vegetables without having recourse to the too usual sardine.

There are two other salads I should have mentioned. This one is an American salad. It consists of celeriac and walnuts and apple, and is called Salade Waldorf. It is dressed with sour cream. The other salad is this little one, Salade Vigneronne; it has grapes in the middle of lettuce dressed with sour cream. It is not a proper salad; it is almost a sweet—the sour cream is just a concession towards the mayonnaise.

I would like people to cook lettuce sometimes, indeed much more often. The inside of a lettuce is so much better than the outside, that if you can find an excuse to serve up the hearts only as a salad and feel you are going to use up the outside leaves as well, it is a help. I think in that case I should use the outside leaves for a soup. I do not know whether you have ever made simple lettuce soup. When you get lettuce soup at hotels it is usually made of milk and arrowroot with a few pieces of lettuce swimming in it. You should put two small lettuces or the equivalent in outside leaves, and about half that amount of spinach, both chopped up, into a saucepan with a little butter and cook it until it "melts." When it is soft put in about 1½ pint of water, just season it with salt and cook it for about half an hour. Then beat up a couple of yolks of egg and a little cream off the milk, and thicken the soup with it. It can be made with lettuce alone, but the spinach gives the lettuce a little more body. You need not sieve the lettuce.

Then there is watercress soup. Boil potatos with a bunch of watercress—not a large bunch, not much stalk—in about 1½ pint of water and just strain through a sieve. It is very good indeed. If you like, you can cook watercress in the same way that the French people cook spinach, that is to say, boil it in plenty of water and then treat it like spinach ; that is, make a purée of it. It is most delicious. Very few people know how to cook watercress, but it is well worth doing.

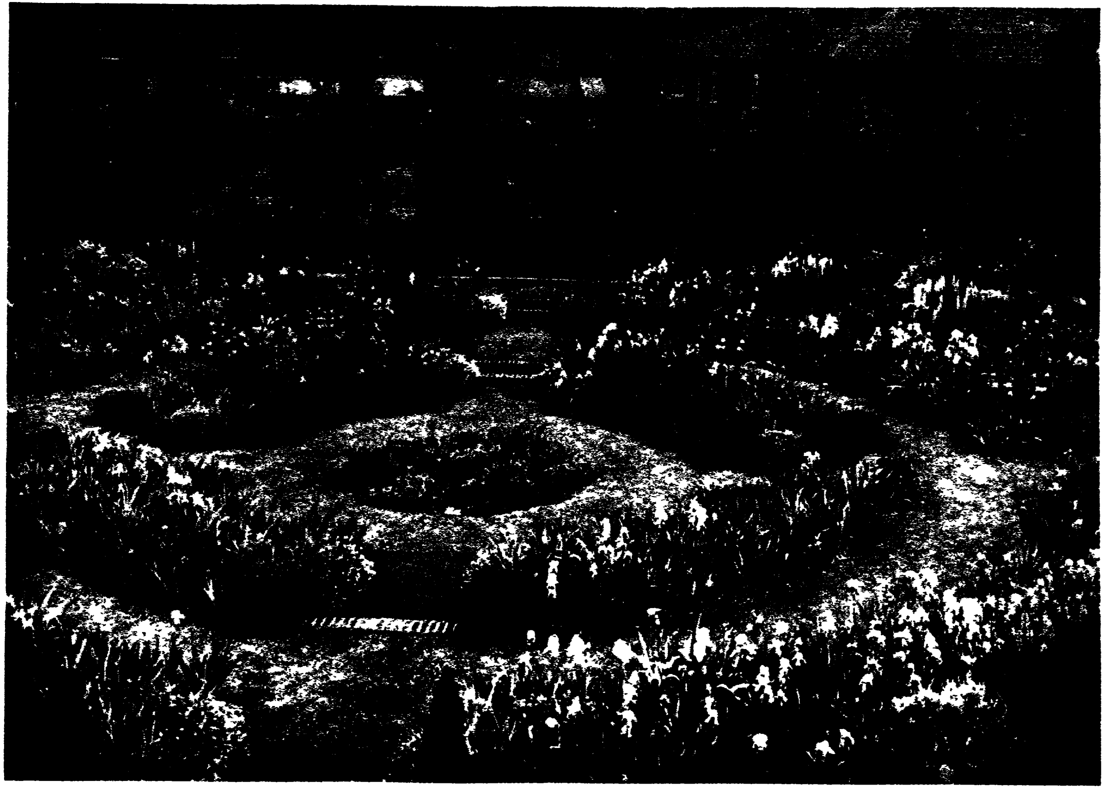


[By courtesy of Country Life

FIG. 89.—MISS PESEL'S IRIS GARDEN

CATHEDRAL IN DISTANCE

[To face p. 404



[By courtesy of *Country Life*

Fig 90 — Miss Pesel's Iris Garden from the Verandah

IRIS COLOURS. HARMONY AND CONTRAST.

By MISS LOUISA F. PESEL, F.R.H.S.

[Read June 6, 1939; F. C. STERN, Esq, F.L.S., in the Chair.]

I WENT to a lecture the other day on English Gardens by a most distinguished lecturer, and he said he would only show us the kind of gardens we should all like in England, because we could not all have big ones. He then showed us slides of what seemed to be enormous gardens that ran into parks, and Italian gardens which seemed almost a mile long. Gradually he got down to some plainer gardens with pleasant herbaceous borders and then to one of which he said " and this is a real backyard garden." I blinked my eyes, for it was my garden. Someone in the audience then asked " Where is it ? " and he replied " I am afraid I do not know." I rose and ventured to say: " It is in Winchester and it was a builder's yard in 1934 when I bought it." This was considered funny. I agreed mentally and I felt I had got a delightful introduction to my talk to you to-day. I am afraid some of my audience may think they are here to listen to a real gardener talking of a really important garden. I am certainly not that—I wonder if I should turn my back so that any of you who want to go out may do so. I really am only a backyard gardener.

I would like to say, however, that I have been at work on the subject of colour for a very long time, and I do not feel colour is learnt in a day.

Many years ago I was in Athens in charge of the Schools of Needlework and Laces for four years. There I had the most marvellous silks to work with, dyed by an old local dyer who produced the most amazingly brilliant silks, when he was sober. Every now and then he would retire and drink hard for three or four weeks (I do not know if the colour went to his head, I used to think it did) and then we had to do without his wonderful silks. One had to know how to put these many brilliant colours together and I gained much valuable experience.

Much more recently I was in charge of the coloured canvas embroidery work at Winchester Cathedral for five whole years. They called me by the rather charming title of " Mistress of Embroideries of Winchester Cathedral." There I had 180 workers under me—some of you may have seen the results. I have therefore had a long experience, but even after all these years I always feel each problem has to be tackled individually—conditions vary and colour always seems to remain a matter of inspiration and hard thinking, whether one knows the accepted rules or not. I will willingly tell all I know, but I still feel that I am only a searcher after an ideal.

Before I made my garden at the White House I grew my Irises for four years on what had been a rubbish heap belonging to a garage next door to the hotel where I was living I had it well dug, and planted them out in rows as one would put them in a nursery and they flourished exceedingly with a minimum of care. Having been asked to write an article on colour planting, I went into the garden to consider the subject—and I thought to myself: " What is the good of saying anything about colour and how to tackle it, if when you just put them in as they come, in straight rows, they look so lovely. I am not sure if they do not arrange themselves as well as when one attempts to plan the colour."

This I tell you, to comfort those who do not wish to be troubled with elaborate planning.

To get back to my own new house. In 1934 I bought a derelict infants' school, took the roof off and added a top story. Next door there was a builder's yard in which stood four large corrugated iron sheds. A car park was being made at the bottom of the High Street, and from its excavations I got eighty loads of nice soil at *6d.* a load, which I did not think was dear, as I had to pay 10*s.* *6d.* a load for some down loam in which to plant some special treasures. Of course we had plenty of good mortar rubble.

Fig. 89 shows the corner of the house with the east end of the Cathedral in the background, from which it will be seen that I am really in the town.

In passing, I would like to urge the value of these flat paving stones, all round the edges of most of the beds. They are only made of cement but have weathered to look like stone. They make it possible to cut the grass paths without having each time to trim the edges. It is easy to plant much more closely up to them than when a space has to be left between the edge of the grass and your planting—a space in which slugs and snails do congregate. I am inclined to think also that this paving going up to the edge of the soil prevents the frost getting to the roots of the Irises. Anyhow, I like the effect.

Figs. 90 and 91 show the broad lines of my layout. Fig. 90, with the high wall running N. and S. with the cottages showing above it, I think explains why it was called a "backyard garden." The grey wooden fence in fig. 91 which has roses on it, is a lovely background for most things, and in particular for all my tall Irises from California. They seem happy here and do well with no special treatment beyond a six-inch raised bed and the fence behind to keep them sheltered. The grey fence seems to accentuate their delicate colouring—Purissima, San Franciso, Los Angelos, Souvenir de Loetitia Michaud, Micheline Charriare and many others make a shining, shimmering mass of pale colours quite early in the season.

I have a firm belief in a more or less uniform edge to a bed, as it seems to hold the picture together. For this, here, I use a pale pink rock rose with grey foliage, and it is attractive.

In the small central bed, I have early Iris reticulatas and dwarfs—Crocus and any small bulbs I can lay hands on—and later blue annuals carry on the tale. Next to the lowest grass path, in the first small circle, I grow intermediate Irises and brilliant purple crocus. After the tall bearded Irises have finished blooming, English Irises make the circle blue again.

Fig. 92 shows the intermediates in full flower: 'Red Orchid,' dark in the foreground, and beyond 'Doxa,' a pale beauty raised by SASS. The tulips above, mainly pale yellows, are nearly over, whilst the tall bearded Irises above are only showing bud.

Fig. 93 shows the centre bed and also the steps, from which it is seen that the rise is very slight. The retaining walls are barely a foot high.

Fig. 94 shows the advantage of the curved beds, a point that Mr. BAKER urged on me when I was planning originally. The picture varies so quickly, and varies too at different times of the day, when the light comes through them and shows up different contrasts according to which way one goes round the circle.

Fig. 95 is a group of 'Purissima' against the grey fence. The white Aquilegia gives an interesting contrast of texture, which is often useful; for this purpose I use mainly the old-fashioned kind and not the long-spurred ones.

Fig. 96 I have inserted to show my real backyard where the seedlings are grown until their first flowering.

The general layout is pleasant in form I think. This is, I believe, because I have used flowering shrubs and evergreens and all sorts of grey plants to mark what I would like to call "the corners of the circle." This marks the circle quite definitely and gives a background, and it also gives a background to the actual planting in the corners of the square. This shaping of the layout is valuable, as it is there all the year round. A good layout is definitely important, because with the quiet colours of the shrubs in the winter a very little extra colour seems to give a surprisingly good effect, as it can be put in in small patches and the value of these small masses is enhanced by the green leaves of the Irises. The value of the individual shrubs also tells enormously if well placed. Even the little walls of the circles, which are not very obvious when covered with bloom, in the winter give drawing to your plan. I think many people who plant gardens do not realize that it is the "beginning thinking," both in planning, colour, choice of shrubs and layout that really matters.

I want to read one short notice, which I think is rather interesting, from a book some of you may know, by JOHN HILL, published in 1775 and described as 'Eden: or a compleat body of gardening . . . . compiled from the papers of T. HALE.' It consists of twelve bound monthly magazines and each contains an article on Irises of all sorts and kinds. One thing he says which, I think, is most true is: "Every good gardener will naturally renew his stock by growing from his own seeds. In this manner he will be able to select just those colours and sizes of plants that he requires for his particular use."

All those years back he realized the value of one's seedlings and the variation of colours one gets amongst one's own seedlings. No nurseryman can supply everything, although he may supply us with his best; our own seedlings may not be as good, but they sometimes are most valuable in that they give us the intermediate colours we may need for a special planting. They give one a chance of balancing colour and giving contrasts that one has forgotten if one waits till next year to buy them.

I have some seedlings from 'Aline' and 'Evolution'—I called one 'St. Swithin.' They are all blues and greys, blends and bicolors, and I have used them in a great many places in my garden. I have one close to 'Lux'; I have never seen 'Lux' look so brilliant as it does with this quiet grey-blue alongside it.

I am sure we do not all appreciate the value of these half-way tones between the brilliant ones. I would urge this point very strongly for your consideration.

After I had bought my plot and had got its measurements, I decided I would use this round shape. I had seen a photograph in the American Iris Society's Bulletin of such a layout and it was called an "Iris bowl" and it seemed suitable, with modifications, for my ground. I then realized that I should have to use all sorts of contrasts every now and again to emphasize or harmonize my plan. You play for harmonies and then emphasize them with contrasts.

It is very much a question of relations between neighbours; it comes to this, that just as we must all be good neighbours, all plants must be good neighbours with the plants immediately next to them. Then, as you do in a party, you bring in some strangers to give a new, an unexpected and different combination. It is often that "unexpected stranger," a seemingly impossible contrast, that suggests fresh departures from accepted rules and traditions. But quite emphatically each plant must agree with the plants on the right and left of it.

I do not think it is enough just to push them in; you do not get far enough with that method. If you combine your plants carefully for colour and then stress the combination with something else, you will get a more lively effect.

When I was working for the Cathedral, I used to tell my Broiderers that they had to use a lot of colours—if they were using red, not to use one only, but to use three or four in the same piece of work, as that would make their work alive.

I had Mr. WILSON of the Colour Council in my garden recently and after seeing some of my embroidery models he said: "You seem to use different colours; you use two or three reds together, that is why your embroidery looks so lively."

Any of you who have seen the work in the Cathedral will have realized that it is very lively and yet it does not shout. That I believe is entirely due to this reason. In some cases we used as many as five or six yellows together for the backgrounds of some of our choir cushions.

I would suggest that in your gardens you do not use too much of one single yellow, but different yellows, nearly alike but not quite, side by side, and then let them be forced up possibly by a little of some really strong ones. I should use lots of pale straw yellow and greys and whites with them to get them into my distance. I would even use yellows quite a long distance off, because if you use whites, greys and very pale blues only it becomes too flat.

The point I have to come back to is that colour must be lively, but not too strident; each plant must be happy with both its neighbours; but with a big mass that is happy, that is in harmony, a sharp and unexpected contrast is often valuable.

This is the thing I have to tell that *really matters.* This list given me by an artist friend when I was planning another garden, I have always found helpful. They are very simple and easy rules.

Creams with russets and warm-toned reds.
Whites and yellows with greys and lavenders.
Deep blue (such as 'Souvenir de Madame Gaudichau') with buffs, apricots and browns (Niebelungen range).
Separate *yellows* from *russets.*
Pinky tones with *whites.*
Separate *brilliant blues* and use them to make point of emphasis in different places.

I think by russets he meant bronze-browns and colours with warm red tones. Such plants as 'King Midas' I much prefer with creams rather than whites. His contention is that *whites* and *yellows* should go with greys and lavenders, because the whites are not far away in tone from lavenders, such as the pallidas and pale blues like 'Corrida.'

I use much grey for my backing shrubs. *Senecio Greyi* is often a saving grace. I used it even against a wall, as if it were a climbing shrub—it is invaluable in winter. When colour as a whole is what one is aiming at, I believe one has to keep one's colours as light as possible. Deep blue and anything bordering on orange is safe, as they are complementary colours.

I sketched out my rough plan and divided it into four sections, the steps coming always in the middle of each section.

In the east section I combined whites, yellows, greys and lavenders, and for depth, violets.

On the south section I used more orange tones and peach colours and added definitely mid-blues. Then coming to the western section in front of the house I have pinks and pale blues and whites; rather French and dainty and the colours closer in tone.

In the north section I put all my warmest colours and purples with creams and pale blue. It is, I believe, generally accepted that in a long herbaceous border the red tones should be in the middle, so that from whichever end one looks at it the strongest colours come in the middle. I could not do this actually, but in effect my warmest colours and reds do come in the middle of the whole garden, more or less.

Having planned my sections roughly as to colour, when the Irises arrived from my cabbage patch I labelled them all as to colour and, of course, with their names and then left my old gardener and his son to go ahead with the planting, knowing that any pale yellows would go in automatically with the whites and greys. If I am away and any plants come, I know it will be all right if they go into their own section for colour; if later on it turns out not to look right we can modify it, but it is a great advantage to have some common and rather loose plan on which one works and which anybody can follow. Supposing one was ill and not able to look after the Irises for a year, or had to go away, a standing plan is a great help and there is not so much to be undone when one takes charge again.

Having decided on the colours for my four main sections, I decided that I must link them up together, and I planted wedges, like the slices of a round cake. These links between my four sections needed to be thought out carefully.

My wedges were:

S.E. corner: *shot* yellows, violets and mid-blues.
S.W. corner: deeper pinks, purples and bronze.
N.W. corner: deeper blues and deeper pinks.
N.E. corner: *clear* yellows, white with dark blue.

The advantage of having the purples and bronzes such as ' Cheerio ' in the N.W. corner is evident because they are seen against the late sun and so are doubly brilliant.

One final suggestion is that it is possible for colour combinations to be found on Chinese pottery and Bokhara embroideries. There is much in the Salting collection in the Victoria and Albert Museum to give ideas for Iris planting. Some of the pottery and porcelain use a dirty queer plum colour, difficult to use but valuable, and this colour occurs in many Irises. On the pottery it is used with a brilliant red and a rather hard, bright lemon yellow. In the Bokhara embroidery one finds a brilliant magenta with a brick-red and a straw-yellow *and* dark blue.

I hope you will not be alarmed at the suggestion to use magentas, for they are extremely valuable especially with blues and pale straw-yellows. They really give a " kick " to the garden, as they are not too heavy or too dark; but I mean real magentas, not just dark reds. It is a mistake to be put off by the name of this colour; as you must have contrasts, of course do not use too much of it or it will lose its potency. If you had the same quantity of two colours that would be all wrong—one should use a little of the emphatic colour and more of the gentler colours, as it is the proportion which helps with any contrast and harmony. It is important to remember to vary the size of the masses. A little brilliant colour low down is more to be desired than a tall brilliant patch higher up, which might upset the values.

It is difficult to compress the experience of a lifetime into a twenty-minutes' talk. Do not be afraid of experimenting with colours, as if they are not right the first time, the plants can always be lifted and put elsewhere. Contessa GUILIO SENNI tells me she lifts hers up often in the middle of the flowering season, in case she should forget where she wants to place them. But whatever you do with colour, enjoy it ; do not be frightened of it, do not let it be your master, but be its master.

[A film in colours taken by Miss K. ENGLAND was shown here, also one taken by a visitor to my garden. Our thanks are due to them both and also to Country Life for the use of slides of photographs they took last year.

Photographs have had to be used in place of the slides and I have used some quite recent ones taken by Mrs. LUKIN and Mr. ALAN BRACE, to whom I offer my thanks.]

* * * * *

DISCUSSION.

MR. PILKINGTON. I do not profess to know anything about colour, but I would like to say I agree almost entirely with Miss PESEL in her use of yellows, but I was sitting next to a gentleman who thought there were too many yellows in that garden. I think you want pale yellows and not the deep brassy ones. I do not want to detract from ' Golden Hind ' it is a most wonderful yellow, but you can have too much of these yellows.

What I would like to ask Miss PESEL to say something about is the matter of colour classification. I do not think it is a thing we can go into in great detail here, because we have not come here to discuss classification so much as colour in a garden, but that is the thing which is puzzling the Iris fraternity more than anything else. If we are to consider colour classification in the garden we shall be led most frightfully astray, because the classification in the Hall downstairs is based on the colour of the flower as it is composed for you, but the colour value in the garden depends entirely on the value of the falls. I want to know whether Miss PESEL agrees. Is it not true that the colour value of the Iris is practically always the value of the falls ?

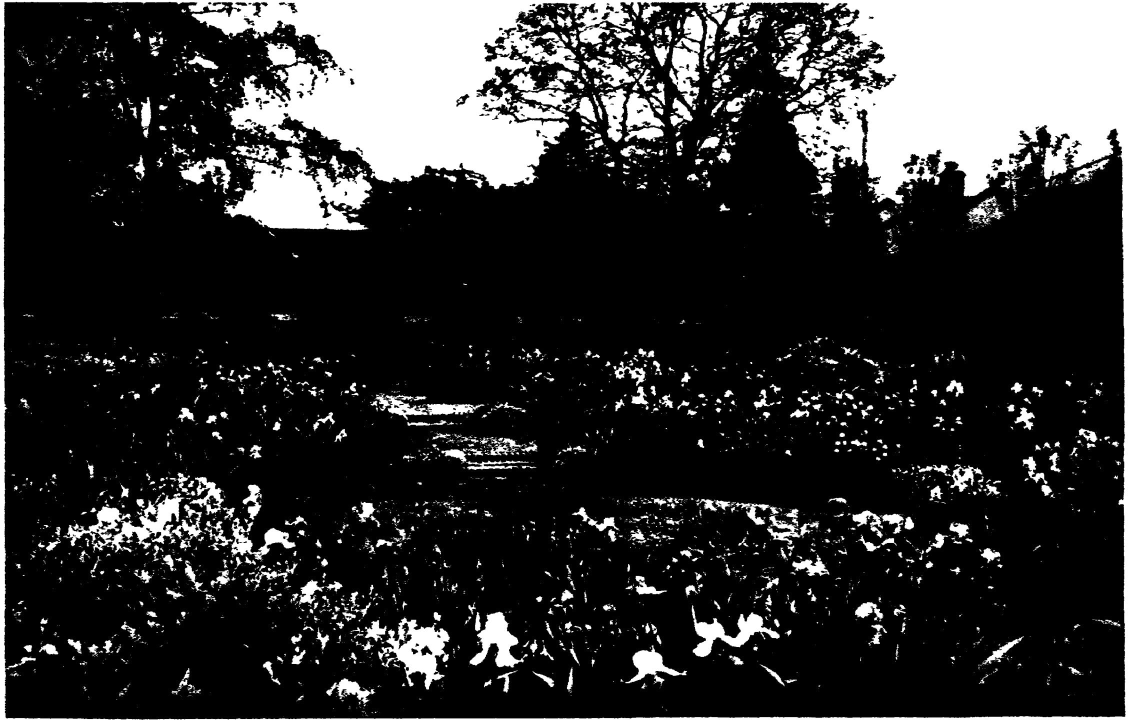
MISS PESEL. I agree with Mr. PILKINGTON that it is always the falls that give the colour to an Iris in the garden. You may take ' Lux ' as an example—honey-coloured standards and raspberry-red falls ; this year it has flowered most beautifully and it makes an impression right across the garden, but it is not the honey colour that tells, it is the strawberry or raspberry, the warm strong tone of the falls. On the other hand the strawberry alone would not tell, I believe, nearly as much as the strawberry with the honey—it is the combination that makes it tell, because the honey lightens it and puts the whole in its place. On the one side I had put the seedlings from my ' St. Swithin ' group which are greyish-blue and mauve. They were the same value in tone as the strawberry-red, and the quieter colour forced out the reds. The effect was carried right across the garden, which was much farther than one would have expected ; they seemed to be set in this grey and blue ; I believe it made all the difference that the standards were honey coloured and not real yellow which would have competed with the red, as it was the full value of the falls told.

To my mind the value of our very simple colour classification is this: if we want to use it for show purposes, there are the big sections, white, yellow, warm colours and cold or cool colours and blends. I think we shall probably have to do as Mr. PILKINGTON tells me they now do in America, that is to put far more Irises into our blends, because a great many may crop up which we do not know where to place, we may even have to insert bicolors in some of our sections, unless we have what I once suggested—a "homeless class." We are beginning to realize there are a number of Irises that are so subtle that they do not come exactly into any colour division, but I do not feel that this detracts from the value of the very simple sections.

I do not know whether any of you remember an article I wrote for the last Iris Year-book on what Mr. SPENDER calls my "Somerset House Trees." It contained the family trees of several Irises. First I gave the name of the particular Iris under review, then its parents, and their parents as far back as I could take them. Against each I put the colour classification letters. It does not matter whether—if it is say a variegata—it is light or dark, but it does matter whether the parent is variegata or blue, or red or yellow or white. I do not suggest it is the only possible classification, but it is quite a sound one for general reference. One does not want a detailed description of each parent, but one does want to be able to see at a glance how often any colour has already occurred in the parentage, in order to estimate how much purple or red, blue, yellow or white, plicata or variegata it has and therefore what results one is likely to get in a seedling from its combined ancestry. Also because it is so simple one soon remembers it without any effort.

MR. SPENDER. I want to emphasize two points. First of all, colour is a matter of taste, and taste is the feminine of genius we have been told. Whether that is so or not, I have been told it is very indiscreet to say that colour is not merely a question of taste, but a matter of educated taste. I think most of us are unconsciously, subconsciously or consciously educating our taste every day in some way or other, so that you really do get some general rules on colour, some of which Miss PESEL has given us; I may perhaps suggest a few more.

The rules I have always worked to you will find largely in Persian pottery, in Persian carpets and in most of our English water-colour schools; you get what I call the dominant, the sub-dominant and the rest in harmony. Miss JEKYLL has a very favourite combination in that way of lavender and pink, she was always working on that with the harmony of a grey background. Then there is the other one: orange and blue, which makes a very fine harmony if you do not emphasize your orange too much. Mr. WILSON, the colour expert, was rather keen on that and said: "The important point is if you have a strong colour, do not put in too much of it, put in much more of the blue than the orange, or if it is a case of yellow and violet, put in more of the violet



[By courtesy of Country Life.

FIG. 91.—MISS PESEL'S IRIS GARDEN.

[To face p. 412.

FIG. 92.—INTERMEDIATE IRISES IN MISS PESEL'S GARDEN

Fig. 93.—Miss Pesel's Garden.
The central bed and the steps. Facing the road.

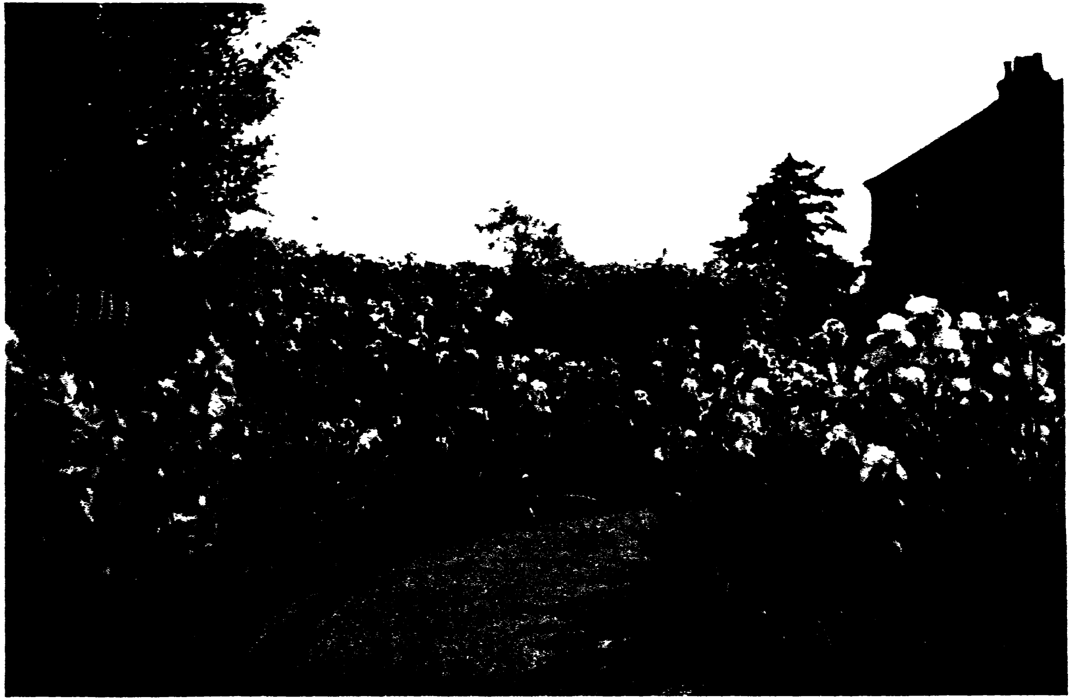


FIG. 94.—MISS PESEL'S IRIS GARDEN.
Corner of upper circular path. Iris ' Natal ' on right.

To face p. 413.

than of the yellow." I find it extraordinarily difficult always to get the right background for yellow which it needs; it does not go very well with the ordinary June green. You have to put it against a shrub like *Berberis Thunbergii atropurpurea*, or one of the Japanese maples, such as *Acer palmatum atropurpureum*; neither yellow nor white can be used very heavily in a garden. Miss PESEL does it wonderfully, but after all, we are not all Miss PESELS. Those are the only arrangements I am going to deal with.

Backgrounds are really more important than your colour scheme; if you get your backgrounds right, you can almost throw your colour about, provided you get the balance right. Get your quiet backgrounds, either grey or copper, and the dark evergreens come in useful, such as *Cupressus Fletcheri*, and the brooms, such as *Cytisus praecox* after they are over all give a grey-green foliage effect which is most helpful.

A MEMBER. On behalf of the rest of the backyard gardeners, I would ask about what area is your garden ?

MISS PESEL. It is two-fifths of an acre, including the house and garage.

THE MEMBER. I think it is perfectly marvellous.

MISS PESEL. Mr. SPENDER always says it looks longer because I emphasize the length from the front door, and from the entrance pergola up to the house you can see right away down to the far wall, and from the side you can see right up towards the cathedral and from side to side across the front of the terrace. I widened my paths a little more than Mr. DILLISTONE advised, and the result is somehow there seems a much greater length than we really have. It has created a good deal of interest, but it is over now for this season. I am only a backyard gardener, so I have no shrubbery, although I do use a number of other things. Mr. SPENDER and I discussed this in our book on Iris culture for amateurs. Another point is, I am a Yorkshirewoman and we are very obstinate, and when I started growing my Irises, my friends said : " Of course if you grow only Irises, you will never have any other colour for the rest of the year." I said : " Well, we will see," and of all the gardens in Winchester, I have a longer season of colour than most of them, because I use a lot of other things.

LILIUM PARDALINUM AND ITS ALLIES.

By Dr. Vollmer.

Lilium pardalinum was first described by Dr. Kellogg in the Proceedings of the California Academy of Natural Sciences, Vol. 2, p. 12, which was published in 1869. Hartweg first collected this Lily in 1848, but did not publish a description. The type specimen has been lost, and the type locality is uncertain. The reason for the loss of the type specimen and the uncertainty of the type locality entails an interesting digression, and, to understand the underlying reasons completely, requires a few remarks about Dr. Kellogg, early San Francisco, and the California Academy of Science.

Dr. Kellogg was born in Connecticut in 1833. He was a physician, not a botanist, and practised medicine in the East. The medical curriculum of one hundred years ago included a great deal of botany, and many botanists had medical training. He arrived in San Francisco in 1849, coming around the Horn with a band of gold seekers, arriving here " with weakish lungs and an empty purse." The population of San Francisco in 1850 was estimated at 15,000, no doubt being much less when he arrived, for ships were arriving at frequent intervals, and the harbour contained many ships whose crews had deserted and rushed to the gold fields.

On April 4, 1853, a group of seven gentlemen, of which Dr. Kellogg was one, held a meeting at the offices of Mr. Lewis W. Sloat, at which was then No. 129, on the west side of Montgomery Street. By the dim light of candles, which they had brought in their pockets, they indulged in " a free conversation and an interchange of views and sentiments," and at this meeting it was decided to organize under the name " The California Academy of Natural Sciences." On May 23 Dr. Kellogg was named Curator of Botany. At the meeting on January 13, 1868, the name was changed to " The California Academy of Science," the name by which it is known to-day. The first publication of the Academy appeared in a newspaper called The Pacific, a paper devoted chiefly to religious subjects, under the heading " The Proceedings of the California Academy of Natural Sciences," in 1854. These proceedings were finally put in a volume and covered the years 1854–1858. It was in the second volume that Dr. Kellogg described *L. pardalinum*. The article as it appeared is as follows :

" This splendid native lily is considered only a variety of *Lilium canadense*, but we think further comparative observations made in the growing state, will prove it to be a different species. It certainly differs as distinctly from *Lilium pardalinum*, as that does from *Lilium canadense* (of which we have never entertained a doubt). We have arrived at this conclusion from careful cultural and attentive observations for more than five years. We have specimens and drawings of both species. There is also a narrow-leaved variety quite common in this vicinity, variety *angustifolium*.

" *Lilium pardalinum* may be described as follows:

> " Leaves lanceolate, acuminate, recurved, three to five-nerved, nerves glabrous, margins somewhat scabrous (four to five inches long, about an inch wide), colored alike deep green above and below, obscurely veiny, removedly verticullate (nine to twelve in a whorl) scattered above and below. Lower leaves spatulate obtuse, clothed in mealy bloom.
>
> " Flowers on long peduncles, ascending in graceful curves from an obtuse angle at the stem, recurved above, stiffly nodding; one to three flowers terminating the stem, lower whorls of four to six flowers; broadly bell-shaped petals strongly revolute; stamens and style equal; stigma not divided.
>
> " The color of the flowers orange in the center, with dark brown or deep purple spots; the spots of this species larger and more sparsely distributed; the outer half of the petal painted bright red with well definated limits.

" This is a remarkably hardy and most singularly prolific lily. The annual production of bulbs is as abundant as the common potato (*Solanum tuberosum*). When boiled or roasted, they are rather too bitter to be palatable, but in this respect they do not differ from the native potato. By suitable washings, they might serve for food; and perhaps by careful culture, prove a useful addition to the agricultural resources of colder climates, especially in the damp and unproductive localities of northern latitudes.

" It is well known that the Chinese among us, make use of the scales of a species of lily which they import, to a considerable extent. They are apparently very nutritive, so far as we are able to decide from the few trials we have made, having very much the flavor of the common garden bean."

So wrote Dr. KELLOGG. In 1906, the city was rocked by an earthquake, and the resulting fire destroyed the greater portion of the city. The building housing the Academy was destroyed and the type specimen of *L. pardalinum* was lost. In passing, may I state that Miss ALICE EASTWOOD was able to save many of the type specimens of our California Flora, but unfortunately none of the Lily specimens was among those saved. The type locality is likewise unknown, but probably Dr. KELLOGG first collected this Lily in Alameda County, just across the bay from San Francisco. ELWES in his Monograph states: " My specimens are more scanty than I could wish, but I have specimens from KELLOGG himself, both of the *Lilium pardalinum* and his variety *angustifolium*. His *pardalinum* is from Alameda County, and is the stout large-flowered form with many leaves."

Distribution.—In the Lily Year-book of 1934, I wrote that "*Lilium pardalinum* is the most widely distributed of the Californian Lilies. While credited to California, it grows in Oregon, Washington, British Columbia, and continues east across the Rocky Mountains. One variety, *Bourgaei*, comes from the shores of Lake Winipeg." In the Lily Year-book of 1935, PURDY states that *L. pardalinum* is limited to California, and without question Mr. PURDY is the greatest living authority on California Lilies.

Personally, I have never collected *L. pardalinum* outside of California. I have purchased bulbs, which I thought were collected in Oregon, from a collector of native plants, Mr. JOHN H. HECKNER. I have written Mr. HECKNER to ascertain if he collected his bulbs in Oregon, but the letter was returned marked "Deceased." His headquarters were at Brownsboro, and Brownsboro is only a few miles from the California border, so I presume we are safe in inferring that he collected the bulbs he sent me in California.

In reviewing the literature, the first article giving its distribution is Dr. BOLANDER's article in the Garden, Vol. 5, p. 1 (1874), in which he states the habitat extends from Vancouver's Island to Oregon and California. Again Dr. BOLANDER gives the same habitat in Dr. WALLACE's Notes on Lilies and their Culture (1879). ELWES, in his Monograph (1880), lists Oregon and California. ADAMS (1913), in his book, Lilies, lists variety *Johnsoni* as "a vigorous variety from British Columbia." ABRAMS (1923), in his Illustrated Flora of the Pacific States, gives the habitat as Jackson County, Oregon to California. Dr. ABRAMS, however, does not recognize *L. Roezlii* as a distinct species, and no doubt refers to *L. Roezlii*. CRAIG (1938), in his Lilies and their Culture in North America, has variety *Johnsoni* as a "vigorous variety from British Columbia." BAILEY's Standard Cyclopedia of Horticulture, under *L. pardalinum* gives the range from British Columbia to California. WOODCOCK and COUTTS (1935), in Lilies, their Culture and Management, gives the habitat as extending "from Jackson County in South Oregon, along the California Coast Range to Monterey and Kern County in Southern California." GREY (1938), in Hardy Bulbs, gives Oregon and California as the habitat.

With all the above references giving the habitat as extending from British Columbia to Southern California, one might assume that Mr. PURDY was mistaken in his article in the Lily Year-book of 1935, in which he states that *L. pardalinum* is exclusively a California Lily. Mr. PURDY gives an excellent explanation regarding *L. pardalinum* var. *Johnsoni* in the Lily Year-book of 1937, p. 20, and I am sure we can accept his explanation; namely, that these bulbs were obtained from California originally. To be certain on this point, I wrote to Mr. EASTHAM, Provincial Plant Pathologist, Vancouver Island, and he writes me as follows: "There is no record of *L. pardalinum* occuring in British Columbia in Henry's Flora of British Columbia, in Flora of Vancouver Island, published by the Provincial Museum, or in MACOUN's Catalogue of Canadian Plants." Dr. JOHN DAVIDSON, Professor of

Botany, University of British Columbia, writes : " I have no reason to believe that *L. pardalinum* exists in British Columbia except as a garden plant or perhaps, though doubtful, as a garden escape." Dr. W. P. WALKER of Victoria, a Lily enthusiast, has given freely of his time, inquiring about old gardens, visiting herbaria, etc., and reports that *L. pardalinum* is not native to British Columbia.

In 1936 I visited Mr. BORSCH, a nurseryman of Maplewood, Oregon, and he informed me that JOHNSON arrived at Astoria about 1870–1880, from Alameda, California, and brought bulbs of *L. pardalinum* with him which he collected on his way to Astoria. I think we can safely infer that Dr. BOLANDER was in touch with JOHNSON, and that is the reason why Dr. BOLANDER gave the habitat as British Columbia, Oregon and California.

I have examined the specimens in the herbaria at the California Academy of Science, the University of California, and the Dudley Herbarium of Stanford University. There are specimens in the herbarium of the University of California as coming from Southern Oregon, which are *L. Roezlii*. In all three herbaria are specimens collected in Siskiyou County, California ; these specimens having been collected a few miles south of the Oregon border. These, likewise, are *L. Roezlii.*

The farthest north true *L. pardalinum* is found at Big Lagoon, Humboldt County.

As to its southern distribution, the literature states its southern boundary is in Kern and Monterey Counties, and Dr. MUNZ, in his Manual of Southern California Botany, does not list this Lily. A few years ago, Mr. PURDY offered *L. pardalinum* ' Golden Glow ' as coming from Santa Barbara County, which is south of Kern and Monterey Counties. I have found this Lily in San Diego County, which is adjacent to the Mexican border. In two trips across the Mexican border I failed to find any Lilies, although I have heard rumours that Lilies were observed just across the border in the Sierra Juarez mountains. From the above, we must conclude that Mr. PURDY is correct, and *L. pardalinum* is strictly a Californian Lily.

The state of California contains two vast mountain systems, the Coast Range and the Sierra Nevadas, and *L. pardalinum* is found in both mountain ranges from within a few miles of the Mexican border to within a few miles of the Oregon border. The State is divided into fifty-five counties, and there are specimens in the various herbaria as collected in twenty-three counties. This will give an idea as to the extent of its distribution. Until recently, the bulbs in commerce coming from California were supplied by one dealer, who grows them in a swamp where they occur native.

Taxonomy.—Being an amateur horticulturist and not a professional botanical taxonomist, it is with a great deal of trepidation that I make the following remarks. In examining the specimens of Lilies in the local herbaria, one is struck by the lack of bulbs accompanying the specimens. Bulb characteristics apparently are not given the attention they deserve, and this is probably the reason professional botanists fail to give specific rank to *L. Roezlii*, and some botanists consider *L. occidentale* and *L. nevadense* as varieties of *L. pardalinum*.

The bulbs of all these Lilies are rhizomatous. The bulbs of *L. pardalinum* branch, producing up to four or five new bulbs each year. *L. nevadense, L. occidentale* and *L. Roezlii* do not have this character. *L. pardalinum* is found in colonies; the others do not produce colonies. The scales likewise vary in the number of joints. The scales of *L. pardalinum* and *L. occidentale* have one to two joints, *L. nevadense* is three-jointed, and *L. Roezlii* is three- to four-jointed.

While horticulture is considered a branch of botany, there is a gap between the botanical taxonomist and the horticulturist. The taxonomist, when naming a species, does so from a dried specimen, or at best from a few living plants observed in the wild state while collecting.

Varieties.—One must remember that environment plays an important rôle, and plants respond to their environment. A season of abundant rainfall will produce plants that are larger with more flowers, while a dry season results in smaller plants and less flowers. A rich soil will produce a more robust plant than a poor one. The higher the altitude, the more intense are the sun's rays, which in turn affects plants. The environment of this Lily varies greatly. I have found it growing at about sea level in Mendocino County to well over a mile high in Tuolumne County. A specimen in the herbarium of the California Academy of Science bears this label: Collected on border of brook, Mission Pine, San Rafael Mountains, Elevation 6,000 ft. I am sure it grows even at higher elevations, and of course, at all elevations in between these extremes. As for moisture, I have found it growing in a dry gulch in Santa Cruz County, with some of the bulbs partly exposed due to the water having eroded the soil away, but in this particular locality the gulch contains a running stream for several months of the year. Again, in Humboldt County, I know a bog which contains a small stream which drains the bog. Along this stream, about a hundred feet below the bog, is a colony of *L. pardalinum* with the bulbs under four inches of running water, and I should judge the bulbs are under water for about eight months of the year. As for soil, it is found in pure sand with a little silt, to heavy loam. It is found in meadows in full sun among grasses, to the deep shade under trees along streams. Obviously this Lily is not particular as to elevation, which means temperature and intensity of sunlight, soil, shade, and to a certain extent moisture. A Lily growing under such varied conditions will naturally show variations.

The following varieties are mentioned in the literature or listed in catalogues:

1. *angustifolium.* Distinguished by numerous flowers, lanceolate leaves about 5 inches long by 1 inch broad, usually in whorls of eight or twelve; but the whorls are often broken and the leaves scattered. KELLOGG stated this variety was common in "this"

vicinity, meaning San Francisco. In the Dudley herbarium of Stanford University are specimens labelled *angustifolium* collected in Santa Cruz County, and Quartz Valley, Siskiyou County. In the herbarium at the California Academy of Science, this variety is represented by a specimen collected in Goose Valley, Shasta County, from Weaverville, Trinity County, Quartz Valley, Siskiyou County, and at Shasta Retreat, Shasta County. It seems most unlikely that this variety should occur in two localities four hundred miles apart. I am sure the specimens from Siskiyou County are *L. Roezlii*, while the specimens from Trinity and Shasta Counties are *L. nevadense*. The lack of bulbs on most of the herbarium specimens makes accurate identification difficult.

2. *Ellacombei, Michauxi*, or *carolianium* (three names for the same plant). This is undoubtedly what is now *L. carolianium*, and is not *L. pardalinum* at all.

3. *Bourgaei*. This is *L. michiganense* (see Lily Year-book, 1935, p. 26).

4. *pallidifolium* also called *puberulum*. This is distinguished by its short, blunt spatulate leaves, which are a paler green. It is very floriferous, producing from twenty to thirty flowers on a stem 5 to 8 feet high, but the flowers are individually smaller and paler, more tinged with yellow at the base, the spots being fewer and smaller. I have been unable to find out where in California this variety occurs.

5. *Warei*. This was introduced by Messrs. T. S. WARE of Tottenham, from " somewhere in the back country of San Diego County, Southern California," and created quite a stir on flowering. It has closely-revolute flowers of the same size and form as typical *L. pardalinum*, but " a clear, solid rich yellow " and very fragrant. (See Lily Year-book, 1938, p. 15.)

6. *fragrans*. When variety *Warei* died out, WARE wrote PURDY to try to obtain more bulbs. PURDY, in turn, had his collectors send him bulbs from San Diego County, and some of those received were fragrant. They were *Warei* in all excepting that there was quite a little red suffused through its yellow base colour. PURDY named the fragrant one *fragrans*.

7. *Johnsoni*. The segments are bright orange for the most part but carmine tipped. This came from a garden on Vancouver Island, British Columbia, no doubt originally coming from California. (See Lily Year-book, 1937, p. 20.)

8. *luteum*. Yellow flowers spotted with brownish purple. Shown by Messrs. T. S. WARE of Tottenham. I am unable to find out where in California the bulbs came from.

9. *Robinsoni*. The strongest grower of all, having, when grown in good soil, stems from 7 to 9 feet. The upper half of the petals are bright crimson, and the orange centre sparsely spotted with brown. The blooms of this variety do not reflex quite so much as in the other varieties. I wonder if this variety is not the same as what is now known as ' Red Giant,' *giganteum*, ' Sunset ' and ' Chinook.'

10. *californicum.* The young shoots of this variety, when they first appear above ground, are of a deeper green than those of any of the other varieties. The upper half of the petals is glowing crimson-scarlet, and the remaining portion orange spotted with large purplish brown dots. This reaches a height of 5 feet. Not obtainable that I know of.

11. *pulilum.* This is a pretty, bright-coloured, low-growing form and one of the first to unfold its blossoms. Not in commerce; unable to determine its origin.

12. *Yuba.* This variety has been recently introduced by Mr. PURDY. The leaves are ovate-lanceolate and pale green, with few in whorls. The flower has a large yellow central zone, very finely dotted maroon, and a light orange-scarlet section. It comes from Yuba county.

13. *Orange Glow.* Another recent introduction by Mr. PURDY from Santa Barbara County, and fragrant. The plant is tall and heavy. The flowers are very large, soft orange, dotted maroon; some faintly, others with large dots. There is sometimes a faint touch of red at the tips of the petals, but as the tips are concealed the effect is of orange only.

14. *giganteum, Sunset, Chinook, Red Giant.* Probably all the same variety. Mr. PURDY thinks this is one of LUTHER BURBANK'S hybrids between *Humboldti* and *pardalinum*, and that he sent the bulbs to Oregon. It was found growing in the garden of a Miss BURNS by Mr. BORSCH of Maplewood, Oregon. Mr. BORSCH informed me that he noticed this Lily in Miss BURNS' garden and was struck by it. Miss BURNS informed Mr. BORSCH that she thought her father obtained the bulbs from JOHNSON forty or fifty years ago, and they had been growing in the garden ever since.

In Humboldt County there is a *L. pardalinum* growing, found by Mr. LEE HARRIS of Scotia, that is either the same Lily or very similar. Mr. HARRIS and I have collected this Lily on several occasions. In 1935 Mr. YEREX, of Tigard, Oregon, sent Mr. HARRIS some bulbs of the Oregon Lily and they were planted beside the Humboldt Lily. In 1936 when they were in bloom we compared the two Lilies. The only difference noted was that the Oregon Lily was less tall, which we attributed to the fact that the bulbs had been moved and not completely established. The Humboldt Lily comes true from seed, yet I am told that the Oregon Lily does not come true from seed, indicating hybrid origin.

Lilium nevadense

L. nevadense Eastwood, spec. nov. Caulis strictus, scabro-puberulens, solitarius ex bulbo squamoso, rhizomato; squamis numerosis, basi articulatis; folis inferioribus paucis, alternis, superioribus 4–7 verticillatis alternisve, oblongo-lanceolatis, 5–15 cm. longis, 2–4 cm. latis, glabris, trinervatis; pedunculis longis, rectis, apice, recurvatis; floribus nutantibus, alabastris lanceolatis, 4–5 cm. longis, perianthi segmentis lanceolatis, recurvatissimis, rubris, aurantiacis vel flavis, maculatis;

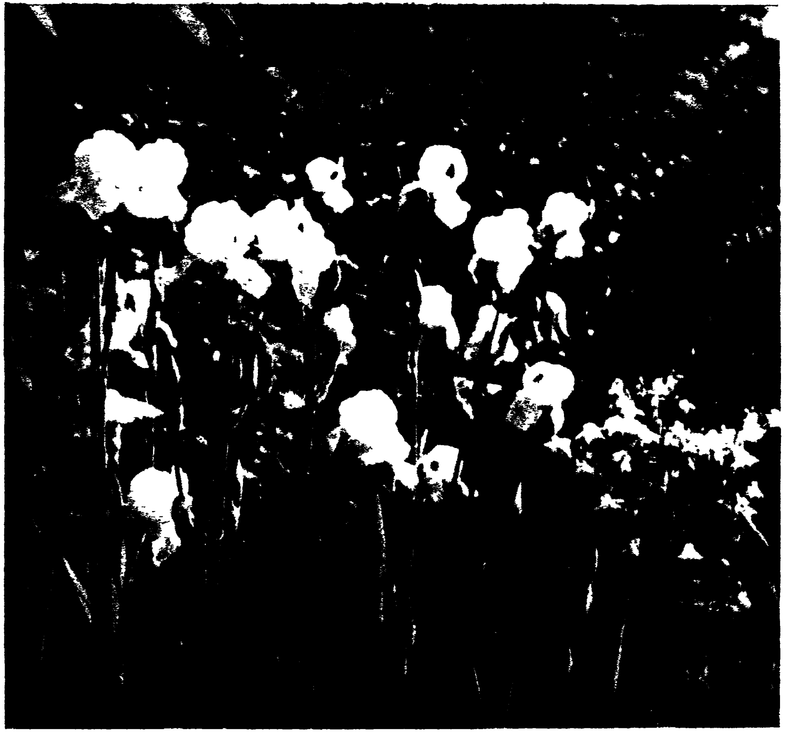


FIG 95 —IRIS ' PURISSIMA ' IN MISS PESEL'S GARDEN.

FIG 96.—MISS PESEL'S IRIS GARDEN
The "backyard" where the seedlings grow.

pistillo et staminibus exsertis, antheris rubiginosis, 5 mm. longis, 2 mm. latis ; capsulis strictis, oblongis, basi et apice truncatis, 2–5 cm. longis, 2 cm. latis, breve stipitatis ; seminibus obliquo-cuneatis, papillosis, 5 mm. latis. (Leaflets of Western Botany, Vol. I, No. 5, p. 41.)

Miss EASTWOOD lists three geographical varieties ; namely *shastense*, from Shasta County, *monense* from Mono County, and *fresnense* from Fresno County. Variety *shastense* has red in the flower, while *fresnense* is pure yellow. I am not familiar with *monense*. All are deliciously fragrant.

L. nevadense differs from true *L. pardalinum* (Kellogg) in the smaller and generally fewer flowers, the short anthers, the broad lanceolate leaves and the single stem arising from the bulb. Rarely, two flowering stalks arise from a single large bulb. The bulbs do not branch as does *L. pardalinum*, and it does not form colonies as does *L. pardalinum*. The flowers are about half the size of *L. pardalinum*, and the anthers about half as long. Variety *fresnense* has the petals much reflexed and the flowers droop at the end of the long, slender, erect peduncle. Variety *shastense* has the leaves much narrower and are more numerous. According to Miss EASTWOOD, variety *monense* has the flowers more open-spreading owing to the shorter ovary. The scales are three jointed. *L. nevadense* is found only in the Sierra Nevada mountains, not in the Coast Range.

Lilium occidentale.

L. occidentale, Purdy. Bulb shortly rhizmatous as in *L. pardalinum* but not dichotomously branching as in that species, nor forming clumps ; scales overlapping closely, either in one long or two shorter joints ; stems 2 to 6 feet high, terete, smooth, dark green ; leaves scattering below, but in whorls of 5 to 12 (or more) in the middle of the stem, lanceolate, acute, 2 to 4 inches long, 3 to 4 lines wide, shining green, smooth ; flowers from a few to 15, umbellate or racemose ; when many, often 6 or 7 will be produced in a circle below with the upper scattering ; peduncles 3 to 9 inches long, nodding at top ; segments of perianth 1¼ to 2½ inches long, the lower broadly lanceolate, 4 to 6 lines wide, oftener blunt at tips, sometimes acuminate, broadly overlapping at base and forming the lower perianth of a broad tube ; the upper ⅔ of the segments revolute (at length) to the pedicel (the outer segments soon become revolute, the inner tardily so, for some days broadly spreading) lower ⅔ of segments light orange-red, thickly spotted with roundish black spots ; upper ⅓ a deep crimson ; the style straight, green ⅔ included in the tube ; stamens little longer, spreading but little from style ; anthers oblong, 2 inches long, dark red, capsule not known. (PURDY, in Erythea, Vol. 103, Am. Bor.)

L. occidentale Purdy, was discovered by Mr. PURDY on Table Bluff, just south of Humboldt Bay. It occurs northward for a distance of about 200 miles into Southern Oregon, to the Rogue River, and is strictly along the coast, except that it extends inland for a distance of about 25 miles where the Rogue River has cut a valley through the mountains, permitting the fog to sweep inland.

The Oregon form is inferior to the one growing on Table Bluff. GABRIELSON is of the opinion that the Oregon form is a true natural hybrid between *L. columbianium* and *L. occidentale.* About a mile north of Brookings, Oregon, there is a field devoted to pasture which is mostly grass, and also containing some clumps of our native Azalea (*Rhododendron occidentale*). In this field *L. columbianium* and *L. occidentale* grow together, *L. occidentale* seeking the shelter of the Azalea, while *L. columbianium* is much more prominent in the open in the grass. The two Lilies are often only a few feet apart, affording ample opportunity for cross pollenation. The Table Bluff type form has much less yellow in the throat, and a greater amount of green.

L. occidentale seems to seek out thickets of shrubs, salmon berry (*Rubus spectabilis*), salal (*Gaultheria Shallon*), hazel nut (*Corylus rostrata*), blackberry (*Rubus vitifolius*), huckleberry (*Vaccinium ovatum*), Azalea (*Rhododendron occidentale*). It is the exception to find it growing in the open among ferns and grasses.

L. occidentale grows solitary; it does not form colonies as does *L. pardalinum*, its rhizome does not branch, its scales are usually single jointed; rarely, in a very large old bulb, an occasional scale is double jointed. It does not grow in wet situations, but receives abundant moisture. The rainfall varies from about 40 inches on Table Bluff to about 60 inches at the Rogue. In addition, summer fogs condensing on the surrounding vegetation keep the ground moist. While *L. pardalinum*, *L. nevadense*, and *L. Roezlii* inhabit streams and bogs, this is not true of *L. occidentale.* The soil is sandy, the upper 3 or 4 inches being composed of peat and leaf mould, and it is in this mixture that the bulbs are found, encased in the roots of shrubs.

Lilium Roezlii.

L. Roezlii Regel, Gartenfl. (1870) 321. t. 667. (Translated from the German.)

"The Lily illustrated has been discovered by ROEZL in the mountains near the Mormon States and shows a close relationship to *L. superbum* L. The latter, however, has much broader lance-shaped leaves and its flowers are arranged into a pyramidal cluster at the top. The stem of this beautiful Lily grows up to 4 feet in height; it shows colour similar to white hoarfrost and is studded with narrow, linear-lance-shaped, dark green three-ribbed leaves, which are more scattered at the lower part of the stem; at the upper part of the stem they are mostly arranged in semi-whorls of 2–6, or are scattered even here. Four blossoming specimens all carried at the top of the stem, two flowers on long stalks which have a single leaf in their lower half. The flowers themselves are bent downwards, the petals are rolled back, are orange-red in colour and from base to middle are marked with black-purple coarse spots. The three outer petals are lance-shaped, the three inner ones somewhat broader, and all of them show a honey-secreting furrow on their inner base. It seems probable that stronger bulbs may carry three flowers simultaneously at the top of the stem, as in all our specimens a small involutionary stalk of a blossom has been found besides the two other stalks. This species, however, seems not to have a pyramidal inflorescence as *L. superbum* has. It may be that it still could stand (like *L. superbum*) the Petersberg climate in the open country.

"Should the bulb, in consequence of long-continued cultivation, develop more flowers in a pyramidal group (like *L. superbum*) the plant illustrated could only be regarded as a narrow-leaved kind of *L. superbum*, in fact as *L. superbum* β. *Roezlii*."

The above appeared in 1870. At that time, State boundaries were ill-defined, and no doubt ROEZLI thought he was in Utah, when in all probability he was in Oregon. The only Lily found in the Rocky Mountains is a form of *L. philadelphicum*, and the above description does not describe *L. philadelphicum*. There are no specimens so labelled in the herbaria at the University of California, California Academy of Science, or the Dudley Herbarium of Stanford University, this Lily being classified as a variety of *L. pardalinum*.

The type is limited to two localities close together in extreme Southern Oregon, while the crimson form has a much wider range, occuring in the Siskiyou mountains in Northern California, and extending north to the southern tributaries of the Rogue River.

It is distinguished from *L. pardalinum* by the fact that the rhizomes do not branch ; it does not grow in colonies ; rarely two flowering stalks come from a single bulb. The scales are 3-4 jointed, and the leaves are narrower and smaller. It is found growing along the banks of streams, in hillside bogs, a similar situation to *L. nevadense*. The region where this Lily is found is well watered, and they are found growing in association with Juncus, Darlingtonia and Azalea.

Cultivation.—*L. pardalinum* is one of the easiest Lilies to grow. It grows readily from seed, scales or bulbs. The bulbs should be planted with 3 to 4 inches of soil above the bulb. As with all Lilies, drainage must be excellent. With good drainage, none of these Lilies will suffer from overwatering. As for soil, any good garden loam is suitable. Partial shade is to its liking, but will grow in full sun.

L. occidentale and *L. Roezlii* are about equally difficult to establish, while *L. nevadense* is the most difficult. However, success may be had if the bulbs are potted up upon arrival in a soil composed of ¼ heavy loam, ¼ top gravel, and ½ peat, then the pots plunged in a cold frame. The soil should be kept moist. This will usually cause new roots to be produced, and unless new root formation is induced, failure will result. In the spring, when the flowering stalk makes its appearance, the pots should be examined. In the event of new roots having failed to form, the bulbs may be left in the pots ; then when the plant has finished the season's growth, the bulbs may be scaled and a start made from scales.

In planting scales, good drainage is essential, for if too much moisture is present the scales will rot. From time to time the scales should be examined, and when bulblets are formed and roots appear, more moisture is given. The bulblets can then be placed in 3- or 4-inch pots and grown on for a season, then in the fall placed in their permanent position.

In my old garden, I was only able to establish an occasional bulb, and lost fully 90 per cent. of the bulbs planted, if not more. I tried planting bulbs at different times from September to March with the usual result: a good flowering stalk and then disappearance of the bulb. Using the above method, however, I have had greater success.

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THE EFFECT OF HOT-WATER TREATMENT ON IRIS BULBS.

By WALTER BUDDIN, M.A., University of Reading.

WHILST studying a Penicillium disease of Iris bulbs it became obvious, during the summer of 1935, that commercial stocks of the varieties 'Wedgwood' and 'Imperator' are commonly infested, if only with a strain or to a slight extent that has comparatively little effect on the growth of the plants, with the stem eelworm, *Anguillulina dipsaci* (recently transferred to the genus *Ditylenchus* by FILIPJEV, 1936). The discoloration of the base of the old flowering stems due to this infestation was seen at the time of lifting the bulbs, while the blackish "streak" symptom (see fig. 97) on the outermost fleshy scale, that is the most obvious characteristic of moderate attack, was noted in numerous stocks, although each of the "streaks" contained relatively small numbers of the parasite. At that time the full significance of the discoloration of the base seen on removing the dry basal cap (the old basal plate of the mother bulb), and the presence of the eelworms in the brown "tunics," that has since been well brought out in Canada by NEWTON, HASTINGS and BOSHER,* was not realized.

In an attempt to eliminate the complicating effect of this eelworm infestation on the experiments with Penicillium, it was decided to pass all bulbs used in that work through the hot-water bath. According to the best information available at that time † 50 minutes at 110° F. appeared to be the most appropriate treatment. Unfortunately, during the following season, the results seemed to be more complicated by the effects of the hot-water treatment than they had been previously by the eelworm. Both 'Wedgwood' and 'Imperator' bulbs were treated; some of them were intended for use in the Penicillium experiments, while other bulbs had been deliberately selected for treatment because they showed the "streak" symptom of eelworm attack. Although eelworm-infested progeny were recovered from untreated affected stocks planted both in boxes for gentle forcing and in the open, in no case did the eelworm obviously affect the growth of the plants above soil level, thus confirming the findings of NEWTON, HASTINGS and BOSHER (*loc. cit.*). There was, therefore, no simple criterion for determining the effect of the hot-water treatment on the eelworms, and no critical observations were made on the treated parasites, partly because, at that date, our knowledge of the location of the parasites in numbers in the bulbs was insufficient. Nevertheless, as the eelworm-affected tissue usually occurs towards the outside of the comparatively small Iris bulbs, it is not improbable that they would be killed by 50 minutes at 110° F.

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* W. NEWTON, R. J. HASTINGS and J. E. BOSHER. Canadian Jour. of Research, XV, 175, May, 1937.

† L. N. STANILAND and A. BEAUMONT. Seale-Hayne Agric. Coll., Newton Abbot, Devon. Pamphlet 44, 1935, p. 5.

The deleterious effects of the treatment on growth and flowering appeared to be more serious with the variety 'Imperator' than with 'Wedgwood.' A general idea of the effect during the first season may be gathered from the following results with a batch of eelworm-infested 'Imperator' that was treated and boxed, on September 17, 1935, in clean soil, and later gently forced. One hundred and fifty bulbs were divided into three equal batches; one lot of 50 was left untreated while the other two were given hot-water treatment at 110° F. for 50 minutes and 75 minutes respectively. Owing partly to the fact that some of the bulbs were undersized, and partly to the relatively poor temperature and growing conditions, only 60 per cent. of the bulbs flowered even in the untreated. Nevertheless, the figures are satisfactorily comparative.

NUMBER OF FLOWERS CUT FROM 50 BULBS.

Untreated . . .	30.
50 mins. H.W.T. . .	24 (including 2 of poor quality).
75 mins. H.W.T. . .	7.

Many of the treated bulbs, especially those given 75 minutes in the bath, gave practically no growth throughout the season. The comparative appearance on April 20, 1936, of boxes containing 25 bulbs each is illustrated in fig. 98.

In the autumn of 1936 a series of boxes was set up so that more critical attention could be given to the effect on sound bulbs of the treatment as a single variable factor. The variety 'Imperator' only was used. Batches of 50 selected bulbs, free from blemish after removal of the outer brown tunics, were given the appropriate treatments on October 7, 1936, and planted the same day in boxes, while further batches of 55 bulbs were subjected to the various treatments and stored for twenty-six days after bathing, in open trays in a cool cellar, before being planted. Clean soil, which had been passed through a Sterilatum some weeks before, was used in all the boxes, which were covered with a shallow layer of sterile ashes and placed in frames, although, in point of fact, the mildness of the ensuing winter made it unnecessary to give any special protection to the boxed bulbs. The plants were flowered out of doors. The hot-water treatment was given in a reasonably efficient small round laboratory bulb bath, the bulbs being loose within wire containers. None of the bulbs was given a period of presoaking in cold water, as is becoming the practice in the United States of America, and the various batches were either left untreated, or given periods of 25, 50, or 75 minutes at 110° F.

Although the intensity of natural infection by Penicillium was not sufficient to interfere with the definiteness of the results from the hot-water treatment, it may be mentioned in passing that, as had been noted in the previous season, treated bulbs were more susceptible to the Penicillium disease during storage than were untreated bulbs.

The first noticeable feature about the hot-water-treated Iris was that the shoots from the treated bulbs were later in coming through the covering ashes. In October 1935, it was found that ' Wedgwood ' bulbs given 50-minutes' treatment were retarded four or five days. With ' Imperator,' both in 1935 and 1936, the effect was exaggerated by the cold days of November and December. It is unnecessary to present the full details, but it may be stated that the retardation amounted to at least nineteen days ; that is, almost half the plants were showing in one of the untreated boxes on November 26, while a corresponding box of bulbs given H.W.T. for only 25 minutes did not reach the same stage of development, at least above ground, until December 15. After the longer periods of treatment the shoots did not appear until January. Although this doubtless has some slight effect on the size of the bulb crop, if not on the quality of the flower, there was no significant difference in the date of flowering in early June : there was certainly no indication of slightly earlier flowering of the treated bulbs as mentioned by STANILAND (*loc. cit.*). On the other hand, the bulbs stored for a period of twenty-six days, and not planted until November 2, were, on the average, four days later in flowering than bulbs planted on October 7 whether treated or untreated.

The numbers of flowers cut are shown in the following table :

IRIS var. 'IMPERATOR.'

Numbers of flowers produced after the treatments indicated.

TREATMENT.	Planted immediately after treatment. 50 bulbs.	Stored for 26 days after treatment 55 bu'bs.	TOTAL. 105 bulbs
Untreated	47	50	97
H.W.T. for :			
25 mins. ..	46	48	94*
50 mins.	36	45	81
75 mins.	26	30	56*

* Two of the flowers produced by bulbs given 25 minutes H.W.T., and 15 of those from bulbs given 75 minutes, were poor, and often deformed.

The results show that 25-minutes' treatment did not have a very serious effect on the flower production, even though there had been marked retardation during the early stages of growth. On the other hand, although these plants were instructive as part of a series of treatments showing the effect on growth, the results are of little practical value because it is unlikely that so short a period as 25 minutes in the bath could be effective in controlling eelworm infestation. A 50-minutes' treatment would appear to be much more effective, but the reduction in flower production following this treatment was a substantial one, and confirmed the results obtained in 1935–1936. A much more serious reduction followed treatment for 75 minutes at 110° F.; 56 flowers from 105 good sized, selected commercial bulbs is a very disappointing result, especially when it is remembered that 15 of this number were poor and often deformed. Moreover, it must be emphasized that the ill effects of hot-water treatment are not restricted merely to a failure to flower. Usually the bulbs seriously affected by the treatment gave no growth at all above soil level, although some produced a side shoot, and a few gave a very weak shoot from the main bulb.

The results obtained in the present investigation are confirmed by the complete failure of Iris bulbs to grow after one hour's treatment at 111° F., on November 5–7, in the experiments described by NEWTON, HASTINGS and BOSHER (*loc. cit.*). At Reading the treatments were carried out at the middle of September in 1935, and early in October in 1936, and with purchased Iris bulbs it is difficult, if not impossible, to obtain delivery much before those times. It is obvious that the margin between death of the eelworms and damage to the bulbs cannot be a wide one, although it is possible that the effect of hot-water treatment might not be so detrimental with home-grown bulbs that could be available for treatment during August. Nevertheless, it is from the purchased stocks that most danger of infesting the garden, or nursery, will arise.

Although much is now known about biologic strains of the stem and bulb eelworm, *A. dipsaci*, much more still remains to be discovered about the capacity of this pest to pass from one host to other, different hosts. As an instance of the danger, the planting of experimental strawberry runners at Reading in soil which had been badly contaminated by growing heavily infested 'Emperor' and 'Ornatus' Narcissus bulbs may be cited. Although the effect proved to be rather transitory, the 'Royal Sovereign' runners showed unexpected, but also unmistakeable signs of eelworm infestation during the first spring after planting. Until further information is available, growers who are unable to risk the losses arising from effective, but damaging, hot-water treatment must regard with suspicion any soil in which Irises have been grown. Those who acquire only small numbers of new Iris bulbs should remove and burn the brown outer tunics, as these may be carrying numbers of eelworms, and should examine the outer fleshy scales carefully for the "streak" symptoms of eelworm attack. They should also remove the dry basal cap and look for discoloration round the area of attachment. Incidental experiments at Reading have shown that there is no noticeable effect on the growth of the plants if this basal cap is removed with reasonable care. Bulbs found to be affected should be destroyed or given a treatment in the hot-water bath for 50 minutes at 110° F., and then planted in isolation.

The writer is much indebted, for their interest and help during the work, to his colleague, Mr. W. E. H. HODSON, and to Mr. W. C. MOORE of the Plant Pathological Laboratory of the Ministry of Agriculture.

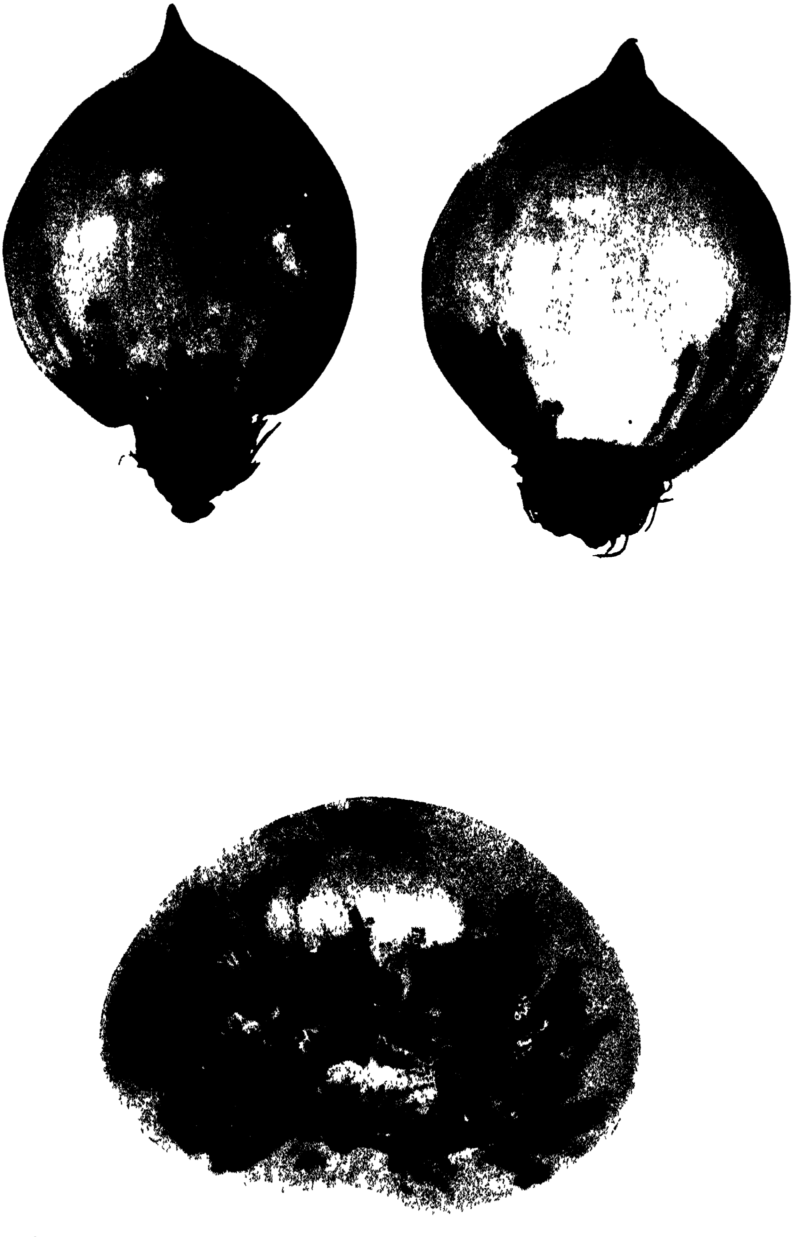

FIG. 97.—“STREAK” SYMPTOMS OF EELWORM ATTACK ON IRIS BULBS.

[*To face p.* 428

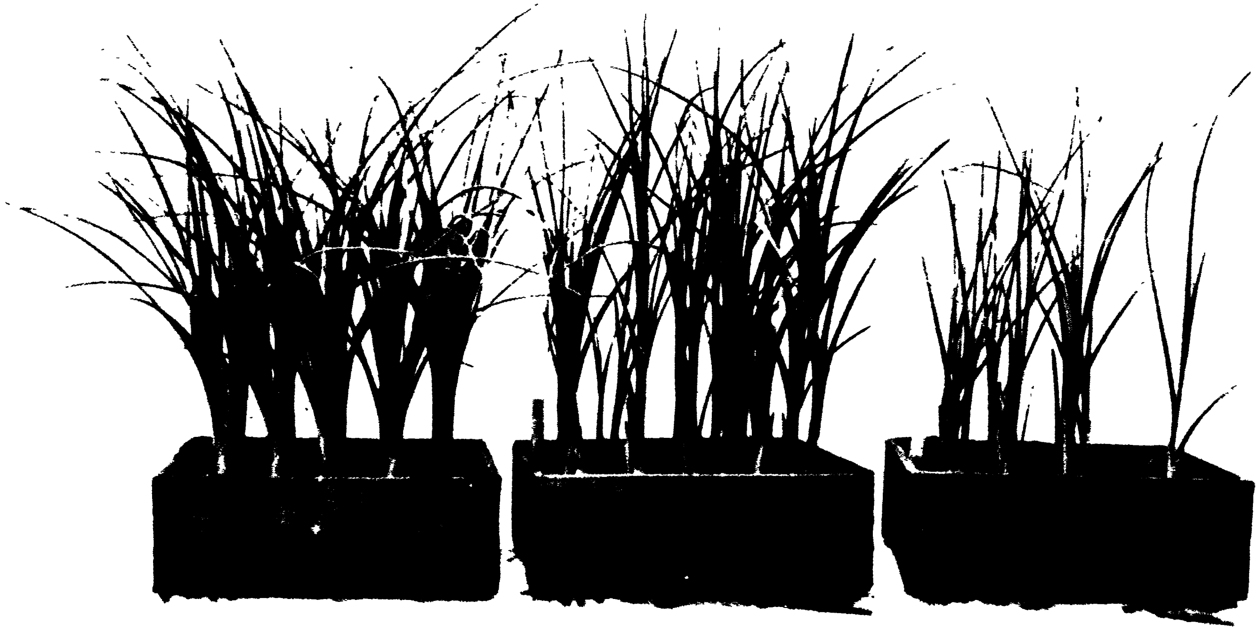

FIG. 98.—EFFECT OF HOT-WATER TREATMENT ON GROWTH OF IRISES

(See text)

FIG. 99.—NARCISSUS CYCLAMINEUS IN THE WOOD AT WISLEY.

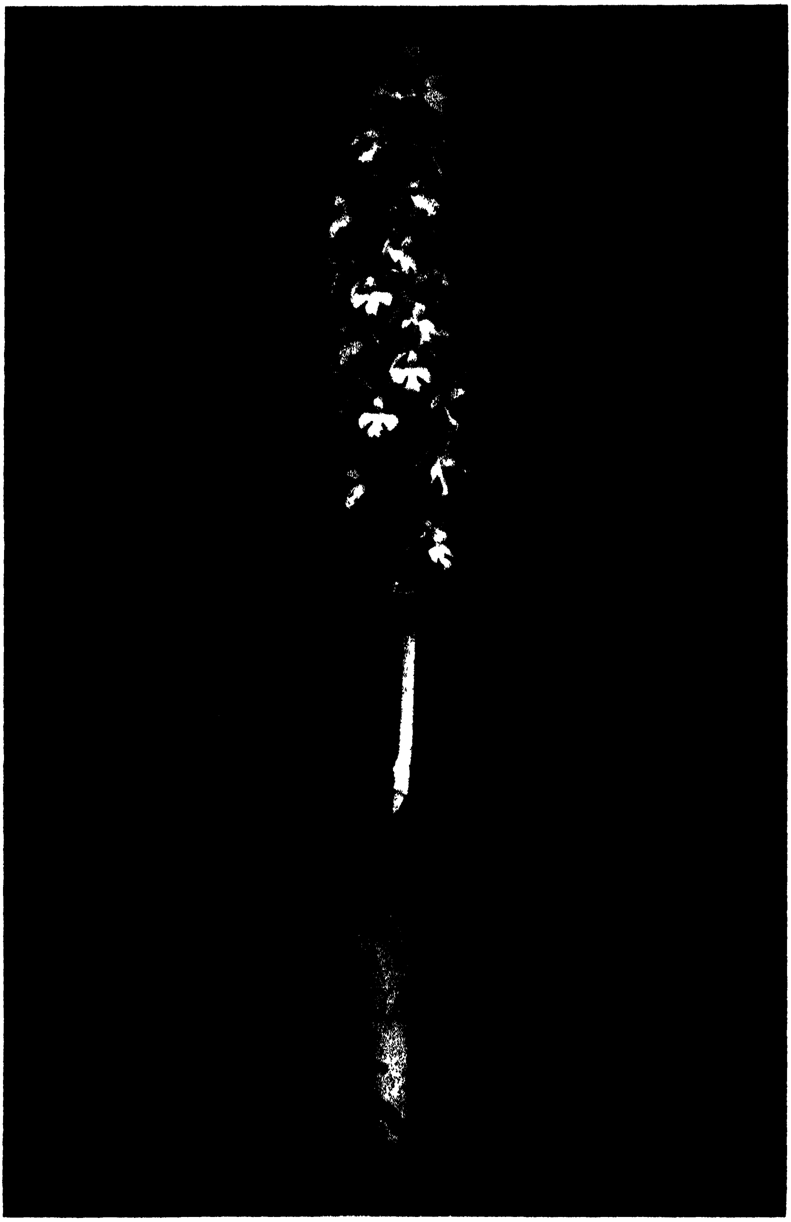

Fig 100.—Calanthe striata Sieboldii elegantissima.
(See p 330.)

[*To face p* 429.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Campanula Scheuchzeri 'Covadonga.' A.M. July 4, 1939. From Messrs. Clarence Elliott, Stevenage. A very distinct variety from the Cantabrian Mountains. The wiry 6-inch stems, rising from tufts of linear leaves, bear narrow-campanulate, pendent flowers of a dark shade of Campanula-violet (H.C.C. 37).

Carnation 'Allan Knapton.' A.M. July 18, 1939, as an exhibition variety. Raised and shown by H. A. Knapton, Esq., Fairfield Road, Orpington, Kent. A border variety with flowers of good form, 2¾ inches across, with rather open centres, flattish, white ground flaked and pencilled dull rosy-red ; calyx strong.

Carnation 'Duke of Kent.' A.M. July 4, 1939, as an exhibition variety. Raised and shown by Messrs. Allwood, Wivelsfield Nurseries, Haywards Heath, Sussex. A border variety of vigorous bushy habit with stout stiff stems carrying well-formed high-centred flowers, 3 inches across, clean white pencilled scarlet, somewhat scented ; calyx strong.

Carnation 'Fidelity.' A.M. July 18, 1939, as an exhibition variety. Raised and shown by Messrs. Richard Bibby, Kelston Nursery, Singleton, nr. Blackpool. A perpetual-flowering variety of robust growth and free-flowering habit with stiff stems. Flowers 3 inches across, full centred salmon-scarlet, sweetly scented, petals slightly fringed ; good calyx and stem.

Carnation 'Gertrude Anderson.' A.M. July 11, 1939, as an exhibition variety. Raised and shown by R. Thain, Esq., Thatch Lossum, Shalford, Nr. Guildford. A border variety of good form and shape, 3 inches across, neyron-rose self, H. C. C. 623.

Carnation 'June Thain.' A.M. July 11, 1939, as an exhibition variety. Raised and shown by R. Thain, Esq. A border variety with well-shaped flower, 3 inches diameter, white ground fancy edged and pencilled with scarlet, H. C. C. 19/1.

Carnation 'Kathleen Davis.' A.M. July 18, 1939. Raised and shown by R. Thain, Esq. A border variety with flowers fully 3 inches across, with high built-up centres, of good form, fully clove-scented, white ground heavily flaked crimson ; stem and calyx strong.

Carnation 'Margaret Beresford.' A.M. July 18, 1939. Raised and shown by R. Thain, Esq. A border variety with flowers of good form, fully 3 inches across, with rather high built-up centres, white, flaked and pencilled bright red ; calyx and stem strong.

Carnation 'Muriel Hawtin.' A.M. July 11, 1939, as an exhibition variety. Raised and shown by R. Thain, Esq. A border variety with a strong clove scent, fully 3 inches across, white ground fancy edged and pencilled crimson-purple.

Carnation 'Winifred Knapton.' F.C.C. July 18, 1939, as an exhibition variety. Raised and shown by H. A. Knapton, Esq. (**A.M.** 1938.) A border variety with flowers 3 inches across, rather flattish with open centre, of good form, cream ground fancy, flaked, especially towards the margins, with bright clear pink, margins of petals serrated, stem and calyx good.

***Chrysanthemum maximum 'Everest.' A.M.** July 27, 1939, as a hardy herbaceous plant. Raised and sent by Mr. F. Yeoman, Leeming, Northallerton, Yorks. Plants, 3 feet tall, of good habit. Flower stalks stiff, 18 to 24 inches long. Flowers single, 5–5½ inches across; petals ½ inch wide, 2 inches long, white, disc 1½ inch diameter, yellow.

***Chrysanthemum maximum 'Pauline Read.' A.M.** July 27, 1939, as a hardy herbaceous plant. Raised and sent by Mr. H. P. Read, Brundall, Norfolk. Plant of compact habit, 2 feet tall, flower stems stiff, 15–18 inches long. Flowers double, freely produced, 3–3½ inches diameter, outer petals creamy-white, inner light creamy-yellow.

Cycnoches aureum, Sander's var. A.M. July 4, 1939. This agrees well in form with the coloured plate of the species in Paxton's Flower Garden, vol. III, tab. 75, where it is described by Lindley under the popular name 'Golden Swan-Orchis,' introduced from Central America by Mr. Skinner. In Sander's variety, obtained from Brazil, the colour is lighter, perhaps best described as greenish-cream, with minute spotting on the sepals and petals. The edge of the white labellum is broken up into short curved processes forked at the point. The present example had a pendulous raceme of sixteen flowers and buds. Exhibited by Messrs. Sanders, St. Albans.

Delphinium 'Bluestone.' A.M. July 4, 1939, as an exhibition variety. Raised and shown by Miss C. I. Marshall, Dalvene, Saltwood, Hythe, Kent. Flower spikes of medium size with rather closely arranged semi-double flowers, 2¾ inches across, Butterfly-blue (H.C.C. 645/1), with a very faint pinkish-mauve sheen; side spikes strong; eye of medium size, black.

Delphinium 'Bridesmaid.' A.M. July 18, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore & Langdon, Bath. Plant of vigorous growth and good habit, with pyramidal flower spikes 3 feet long. Flowers semi-double, 2½ inches across, evenly spaced, pale Bishop's violet (H.C.C. 34/3), outer petals spectrum blue (H.C.C. 45/2).

Delphinium 'Darkie.' A.M. July 4, 1939, as an exhibition variety. Raised and shown by Miss C. I. Marshall. Flower spikes stiff, of medium length, pyramidal in shape, with few side spikes; flowers semi-double, flat, 3 inches across, of a darker and greyer hue of Cobalt-violet (H.C.C. 634), outer petals tinged a bluer tone of Veronica-violet (H.C.C. 639); eye large, black and Cobalt-violet.

Heliconia rostrata. A.M. July 18, 1939. From Lionel de Rothschild, Esq., Exbury, Southampton. A large Peruvian herbaceous plant with long-stalked elliptical leaves 4 to 5 feet long, somewhat

* **After trial at Wisley.**

resembling those of the Banana, to which the plant is closely related. The inflorescence is most remarkable, and consists of a stout pendent axis bearing a series of lateral cymes of inconspicuous flowers almost hidden by the large compressed bracts. The curved bract is 3 to 5 inches long, scarlet (H.C.C. 19), edged with aureolin (H.C.C. 3) and marked with a single vivid green stripe along part of the margin.

Lilium amabile var. luteum. A.M. July 4, 1939. From Messrs. W. A. Constable, Burnham. *Lilium amabile* is a small and graceful Korean species with orange-red flowers. The seedling form to which this award is made has waxy flowers 2½ inches in diameter with strongly reflexed petals of Indian-yellow (H.C.C. 6/1) spotted on the inner surface with dark red.

Lilium × 'Shuksan.' A.M. July 18, 1939. From Major F. C. Stern, O.B.E., M.C., Goring-by-Sea. The parentage of this striking hybrid, which was raised at the Bellingham Experimental Station in the U.S.A., is stated to be *L. Humboldtii* × *L. pardalinum.* It is a stout plant, 5 to 6 feet high, with several whorls of broad-lanceolate leaves about 6 inches long. The specimen exhibited bore eleven large pendent flowers with strongly reflexed perianth-segments of cadmium orange (H.C.C. 8/1 to 8/2) spotted with maroon.

Nerium Oleander carneum fl. pl. A.M. July 4, 1939. From Lionel de Rothschild, Esq., Exbury. This fine variety has shapely double flowers nearly 2½ inches across in large, branching panicles. The colour is Rose-madder (H.C.C. 23/2 to 23/3).

Odontonia × 'Ibran,' East Burnham Park var. A.M. July 18, 1939. The spike bore six large flowers, in which the petals are broader than in the majority of Odontonias, mainly rose and ruby-crimson, the labellum having a reddish base and a yellow crest. The result of crossing *Odontonia* × 'Dorina' with *Odontoglossum* × 'Serapis.' Exhibited by H. Barnard-Hankey, Esq., East Burnham Park, Slough.

Schizophragma hydrangeoides rosea. A.M. July 18, 1939. From Messrs. Hillier, Winchester. A climbing Japanese shrub with sub-orbicular or broad-ovate leaves 3 to 4 inches long and broad, and flattish panicles of small creamy-white flowers. Around the inflorescence are developed a number of cordate pale crimson (H.C.C. 22/3) bracts about an inch in length.

***Sweet Pea 'Blue Gown.' H.C.** June 17, 1939. Raised and sent by Messrs. R. Bolton, Halstead, Essex. Flowers large, in fours on 9-inch stems, standards and wings, heliotrope (H.C.C. 636/2).

***Sweet Pea 'Cowrie.' H.C.** June 17, 1939. Raised and sent by Messrs. Carters' Tested Seeds, Raynes Park, S.W. Flowers large, in fours on 12-inch stems, mostly single, but a few with double standards, carmine-rose on a cream ground (H.C.C. 621/2).

***Sweet Pea 'Golden Star.' A.M.** June 17, 1939. Raised and sent by Messrs. R. Bolton. Flowers large, in fours on 12-inch stems, retaining their colour well, standards poppy red on white ground (H.C.C. 16/2), wings bright geranium-lake on white (H.C.C. 20/2).

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* After trial at Wisley.

***Sweet Pea 'Nippy.' H.C.** June 17, 1939. Raised and sent by Messrs. E. W. King of Coggeshall, Essex. Flowers large, mostly in fours but with many fives, on 10- to 12-inch stalks, rose-bengal on a white ground (H.C.C. 25/3).

***Sweet Pea 'Ottawa.' H.C.** June 17, 1939. Raised and sent by Messrs. Sutton, Reading. Flowers large, mostly in fours, single with a few semi-doubles, rose-madder on a cream ground (H.C.C. 23/3), margins of standards edged with a deeper shade (H.C.C. 23/2).

***Sweet Pea 'Romance.' H.C.** June 17, 1939. Raised and sent by Messrs. Carters' Tested Seeds. Flowers large, in fours, on 12-inch stems, rose-bengal on a cream ground (H.C.C. 25/2).

***Sweet Pea 'Scotty.' H.C.** June 17, 1939. Raised and sent by Messrs. R. Bolton. Flowers large, in fours on 9- to 12-inch stems, mauve on a cream ground (H.C.C. 633/3).

***Tradescantia virginica 'Leonora.' H.C.** July 27, 1939. Raised by the late Mr. M. Prichard, introduced and sent by Messrs. M. Prichard, Christchurch, Hants. A hardy herbaceous plant, 2 feet tall, of bushy habit ; flowers single, 1½ inch across, Campanula violet (H.C.C. 37).

***Tradescantia virginica 'Osprey.' H.C.** July 27, 1939. Raised by the late Mr. M. Prichard in 1936, introduced and sent by Messrs. M. Prichard. A hardy herbaceous plant, 2 feet tall, of bushy habit ; flowers single, 2 inches across, white, faintly bluish-violet, filaments of the anthers hairy methyl-violet (H.C.C. 39).

Vanda teres alba, Gatton Park var. F.C.C. July 18, 1939. This is a pure albino form of the species, the rose colour having entirely disappeared. The side lobes of the labellum fold over the column, and these are light yellow on the inner surface. Exhibited by Sir Jeremiah Colman, Bart., Gatton Park, Reigate. The earliest record of the albino variety appears to have been in 1875, when Reichenbach described it under the name *Vanda teres candida,* a plant which flowered with Lord Crewe, in Cheshire.

***Veronica incana 'Wendy.' H.C.** July 27, 1939, as a hardy herbaceous plant. Raised and sent by Messrs. T. Carlile, Loddon Nurseries, Twyford, Berks. Plant of compact habit, foliage light grey green ; flower spikes freely produced, 9–12 inches long, with many side spikes, giving a succession ; flowers single, campanula-violet (H.C.C. 37/1).

Vuylstekeara × 'Susa.' A.M. July 18, 1939. The spike bore eight well-formed flowers of rose-purple ground with ruby-crimson blotching. This richly-coloured hybrid results from the crossing of *Odontonia* × 'Dora' with *Odontioda* × 'Gwentara.' Exhibited by H. S. Wharton, Esq., "Shalstone," Templewood Avenue, Hampstead, N.W. 3.

* After trial at Wisley.

BEARDED IRISES AT WISLEY, 1938.

The trial of Bearded Irises at Wisley was continued on the same lines as before, and this report deals with the awards made in 1938 and indicates the varieties still on trial for future judgment, those relegated to the General Collection, and the acquisition of new varieties to be judged.

There was no judging of the trial in 1937 as the plants had not sufficiently advanced after the check of the replanting in 1936. The name in brackets after the variety indicates the raiser.

Class I. White or Nearly White Varieties.

Modestie (raised and sent by Messrs. Cayeux et le Clerc). **A.M.** June 14, 1938.—Described R.H.S. Journal, **60**, 454.

The following varieties were grown and are retained :

Azulado (Mohr)
Cloda (Dykes)
Lady Hudson (Murrell)
Mount Athos (?)
My Own (Troup)
Natal (Pilkington)
Pervaneh (Murrell)
Polar King (Donahue)
Selene (Connell)
Silver Jubilee (Bunyard)

The following variety has been added for future judgment :

Fleur d'Amour (Baker)

Class II A *a* (1).

The following variety was grown and is retained :

Maid of Kent (Baker)

The following varieties have been relegated to the General Collection :

Blue Opal : 30 inches ; June
True Charm : 30 inches ; June

Class II B.

The following varieties were grown and are retained :

Cirrus (Burton)
Skiddaw (Pilkington)

Class III B.

The following variety was grown and is retained :

Rheintocher (?)

Class IV *a*.

The following varieties were grown and are retained :

Azyiade (Cayeux)
Blue June (Donahue)
Cydnus (Wallace)
Izar (Bunyard)
Kamet (Baker)
Thuban (Bunyard)

The following varieties are relegated to the General Collection

Clytemnestra : 32 inches ; June
Deese : 40 inches ; June
Minnieford : 30 inches ; May–June

Class IV *b*.

Maisie Low (raised by Messrs. Lowe and Gibson and sent by Messrs. L. A. Lowe). **F.C.C.** June 14, 1938.—Described R.H.S. Journal, **58**, 200. (**A.M.** 1932.)

Destiny (raised by Miss Jean Burgess, introduced by the Orpington Nurseries and sent by G. L. Pilkington, Esq.). **A.M.** June 14, 1938.—Plant of vigorous growth but rather slow to increase, with erect, glaucous-green foliage, 24 inches high. Flower stems erect, straight, 42 inches high, 8-flowered, branches short. Flowers large, stiff, well-proportioned. Standards domed, 3 × 2¾ inches, rich violet-purple with a faint smoky effect, base tinged bronze. Falls drooping, 3 × 2½ inches, deep rich velvety-violet purple. Beard orange. Flowering for fourteen days from June 10.

The following varieties were grown and are retained :

ANTRIM (Morrison)
BRAHMIN (Meyer)
CENTAURI (Bunyard)
CHALLENGER (Sass)
CHANCELLOR (?)
GENTIUS (Sass)
GRACE (Stern)
GRAND MONARCH (Rowell)
KAFFIR (Pilkington)
PALAEMON (Wallace)
SANTA CLARA (Mitchell)
VELVET KING (?)

The following varieties have been relegated to the General Collection :

DR. POTTER : 8 inches ; May
J. NORMAN : 42 inches : June
MORNING GLORY : 42 inches ; June
NIGHTSHADE : 30 inches ; June
PRAETOR : 30 inches ; June
ZAMPA : 34 inches ; June

The following variety has been added for future judgment :

JULIANA (Stern)

CLASS IV *c*.

Evelyn Benson (raised by Mrs. O. Murrell, introduced and sent by the Orpington Nurseries). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 36 inches high, erect, zig-zagged, 6-flowered, branches short. Flowers of medium size, stiff, well-proportioned. Standards domed, 2⅛ × 1¾ inches, bright rosy-carmine, base yellowish. Falls straight-hanging, 2 × 1¾ inches, bright rosy-carmine, deeper than standards, suffused with bronze. Beard white, tipped light orange. Flowering for fourteen days from June 5.

The following varieties were grown and are retained :

FRIEDA MOHR (Salbach)
PILLNITZ (Steffen)
PINK LOTUS (Neel)
RENÉ CAYEUX (Cayeux)
ROSE DOMINION (Connell)
ROTA (?)
THEL (Long)

The following varieties have been relegated to the General Collection :

BRUNOLD : 42 inches ; June
CAPT. COURAGEOUS : 42 inches ; June
MAGNET : 42 inches ; June

The following variety has been added for future judgment :

RED ORCHID (Sass)

CLASS IV *d*.

The following varieties were grown and are retained :

SEEDLING 1/E/57 (Burgess)
WELLINGTON (Burgess)

CLASS V *a*.

The following varieties were grown and are retained :

BLUE DANUBE (Meyer)
GRANNY (Baker)
GLORIOLE (Gaze)
LADY LOU (Dean)
MILLARION (Millet)
VIVIEN (Harrison)
WYNN HELLINGS (Wynn Hellings)

The following varieties have been relegated to the General Collection :

Blue Banner : 32 inches ; June
Commodore Fellowes : 30 inches ; June

Class V *b*.

The following varieties were grown and are retained :

Blue Velvet (Loonis)
Bunny (Stern)
Calixa (Dykes)
Gold Crest (Dykes)
Myddelton Blue (Bowles)
Nemo (Cayeux)
San Diego (Mitchell)
Tasman (Burgess)

The following variety has been added for future judgment :

Ultra (Sass)

Class V *c*.

Airy Dream (raised and introduced by Miss G. Sturtevant and sent by G. L. Pilkington, Esq.). **A.M.** June 14, 1938.—Of vigorous growth and rapid increase with erect, glaucous-green foliage, 18 inches high. Flower stems 40 inches high, erect, zig-zagged, 8-flowered. Flowers of medium size, stiff, well-proportioned. Standards domed, 2¾ × 2⅛ inches, soft pinkish-mauve. Falls straight-hanging, 2¼ × 2 inches, soft pinkish-mauve, deeper towards the middle. Beard white, tips of hairs orange. Flowering for twelve days from June 6.

The following varieties were grown and are retained :

Constance Meyer (Meyer)
Fascination (Cayeux et le Clerc)
Noura (Dykes)
Rose Petal (Murrell)
Thais (Cayeux et le Clerc)

The following variety has been relegated to the General Collection :

Ma Belle : 28 inches ; May–June

Class V *d*.

The following variety was grown and is retained :

Puck (Sass)

The following variety is relegated to the General Collection :

Lustre : 34 inches : May–June

Class VI *a* (1).

Horace Vernet (raised and sent by Messrs. Cayeux et le Clerc). **A.M.** June 14, 1938.—Plant of moderate vigour, but of rapid increase, with erect, glaucous-green foliage, 18 inches high. Flower stems 24 inches high, erect, zig-zagged, with short branches, 8-flowered. Flowers of medium size, stiff and well-proportioned. Standards domed, 2¼ × 1¾ inches, dull smoky-lavender, base bronze. Falls 2 × 1½ inches, drooping, bright clear lavender-blue, veins brownish, distinct on haft. Beard bright orange. Flowering for sixteen days from June 1.

The following varieties were grown and are retained :

Balroudour (Sass)
Ningall (Ayres)
Reflections (Burton)

The following varieties have been relegated to the General Collection :

Nepenthe : 30 inches ; June
Rhea : 42 inches ; June

CLASS VI *a* (2).

The following varieties were grown and are retained :

COPPERPIECE (Kellogg)
GOLDEN MARTLET (Baker)
SANDIA
SEEDLING P. 31/17 (Sass)

The following varieties have been relegated to the General Collection :

A. K. T. : 36 inches : May–June
ALCINA : 32 inches ; May–June
DAY DREAM : 36 inches ; June
ENION : 38 inches ; June
MDME. RECAMIER : 42 inches ; May–June
RENÉ DENIS : 30 inches ; June

CLASS VI *b*.

The following varieties were grown and are retained :

PRINCE TIKHA (Meyer)
SARAH BROWN (Stern)

The following variety has been relegated to the General Collection :

WARRIOR : 38 inches ; June

CLASS VI *c* (1).

Betelgeuse (raised by Mr. G. N. Bunyard, introduced and sent by Messrs. G. Bunyard). **F.C.C.** June 14, 1938.—Plant vigorous, of rapid increase with erect, glaucous-green foliage, 24 inches high. Flower stems 42 inches high, erect, straight, 8-flowered. Flowers large, stiff, well-proportioned. Standards domed, 3 × 2¾ inches, rich smoky wine-purple, base smoky bronze. Falls drooping, 3 × 2¾ inches, deep rich velvety wine-purple, haft brownish.

Députe Nomblot (raised and introduced by Messrs. Cayeux et le Clerc and sent by Mr. F. C. Brown). **F.C.C.** June 14, 1938.—Plant vigorous, of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 44 inches high, erect, somewhat zig-zagged, 8-flowered. Flowers large, well-proportioned, stiff. Standards domed 2¾ × 2½ inches, bright brownish wine-purple, base old gold. Falls drooping, 2½ × 2¾ inches, rich velvety violet-purple, veins brownish, distinct at beard and on haft. Beard rich orange. Flowering for fourteen days from June 9.

Ceballeri (raised by Mr. G. N. Bunyard, introduced and sent by Messrs. G. Bunyard). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 40 inches high, erect, straight, 10-flowered. Flowers large, stiff and well-proportioned. Standards domed, 2¾ × 2½ inches, rich bluish-purple tinged pale bronze. Falls drooping, 2½ × 2⅜ inches, deep rich velvety plum-purple, shaded deep brown at beard and on haft. Beard rich orange. Flowering for eighteen days from June 1.

Dauntless (raised and introduced by Mr. Clarence P. Connell and sent by Mrs. E. A. S. Peckham). **A.M.** June 14, 1938.—Vigorous, but rather slow of increase, with erect, glaucous-green foliage, 22 inches high. Flower stems 44 inches high, erect, somewhat zig-zagged, 8-flowered. Flowers large, stiff, and well-proportioned. Standards domed, 3 × 2½ inches, bright rich wine-purple, base smoky bronze.

Falls straight-hanging, 2¼ × 2⅜ inches, rich velvety wine-purple. Beard dull smoky yellow. Flowering for fourteen days from May 30.

Lyra (raised by Mr. G. N. Bunyard and sent by Messrs. G. Bunyard). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 40 inches high, erect, somewhat zig-zagged, 8-flowered. Flowers large, stiff and well-proportioned. Standards domed, 2⅜ × 2½ inches, dull smoky pale plum, base bronze. Falls straight-hanging, 2¾ × 2⅜ inches, bright electric blue, shading to smoky plum-purple at margins. Beard bright orange. Flowering for fourteen days from June 6.

Petrea (raised and sent by Messrs. R. Wallace). **A.M.** June 14, 1938.—Described R.H.S. JOURNAL, **60**, 460. (**H.C.** 1934.)

The following varieties were grown and are retained :

BLENHEIM (Stern)
BURMAH (Pilkington)
CHEERIO (Ayres)
IRAN (Baker)
JEB STUART (Washington)
JOYCETTE (Sass)
MEDRANO (Vilmorin)
MELCHIOR (Wallace)
MEROPE (Bunyard)
ROSE ASH (Morrison)

The following varieties have been relegated to the General Collection :

ECSTACY : 40 inches ; May–June
GLOWING EMBERS : 38 inches ; June
ILSAN : 30 inches ; June
SACHEM : 42 inches ; June

CLASS VI *c* (2).

Shah Jehan (raised by Mr. E. W. Neel, introduced and sent by the Orpington Nurseries). **A.M.** June 14, 1938.—Described R.H.S. JOURNAL, **60**, 461. (**H.C.** 1934.)

The following varieties were grown and are retained :

BALI (Brown)
FRA ANGELICO (Vilmorin)
FROMENTIN (Cayeux)
NANETTE (Millet)
MELBOURNE (Pilkington)
ORIENT PEARL (Murrell)
M/10/C (Pilkington)
M/10/E (Pilkington)
TALISMAN (Murrell)
WITCHERY (Orpington)

The following varieties have been relegated to the General Collection:

AMBER WAVE : 36 inches ; June
PENDELL : 42 inches ; June
PRIME : 38 inches ; June
ROMULUS : 32 inches ; June
SEVILLE : 36 inches ; June

CLASS VII *b*.

Watteau (raised and sent by Messrs. Cayeux et le Clerc). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 22 inches high. Flower stems 36 inches high, erect, zig-zagged, 8-flowered. Flowers large, well-proportioned, stiff. Standards domed, 2⅛ × $1\frac{7}{16}$ inches, buttercup-yellow, base tinged brown. Falls almost horizontal, 1¾ × $1\frac{7}{16}$ inch, pale bluish-lavender, margins pale yellow, veins brownish and distinct on haft. Beard orange. Flowering for fourteen days from May 28.

Rafi (raised by Mrs. O. Murrell, introduced and sent by the Orpington Nurseries). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 22 inches high. Flower stems

42 inches high, erect, somewhat zig-zagged, 8-flowered. Flowers large, well-proportioned, stiff. Standards domed, 2¾ × 2¼ inches, violet-purple with broad sulphur margin, veins brownish, distinct at beard and on haft. Beard bright yellow. Flowering for fourteen days from June 6.

The following varieties have been relegated to the General Collection :

AUBADE : 36 inches ; May–June
CANADA : 38 inches ; May–June
ESCAMILLO : 30 inches ; June
HARMANIA : 7 inches ; May
SEQUANA : 32 inches ; June
THRUDWANG : 32 inches ; June

CLASS VII *d*.

Detaille (raised and sent by Messrs. Cayeux et le Clerc). **A.M.** June 14, 1938.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 22 inches high. Flower stems 28 inches high, erect, straight, branches short, 8-flowered. Flowers large, stiff, and well-proportioned. Standards domed, 2¼ × 1¾ inches, pale buttercup-yellow, middle paler. Falls drooping, 2 × 1¾ inches, pale reddish-chestnut margins narrowly edged pale dull yellow. Beard bright orange. Flowering for fourteen days from June 1.

The following varieties were grown and are retained :

BANDEROLE (Morrison)
PICADOR (Morrison)
SWORD OF STATE (Burton)

CLASS VIII *a*.

Pluie d'Or (raised and sent by Messrs. Cayeux et le Clerc). **A.M.** June 14, 1938.—Of moderate growth and rather slow of increase, with erect, glaucous-green foliage, 12 inches high. Flower stems 28 inches high, erect, zig-zagged, branches short, 8-flowered. Flowers of medium size, stiff, well-proportioned. Standards domed, 2⅛ × $1\frac{1}{16}$ inches, bright rich yellow. Falls straight hanging, 1⅝ × 1½ inch, bright rich yellow. Beard orange. Flowering for twelve days from June 6.

The following varieties were grown and are retained :

ADEN (Pilkington)
GOLD COAST (Pilkington)
GOLDEN WEST (Sass)
MONSERRAT (Pilkington)
SUNBEAM (Murrell)

The following variety has been added for future judgment :

HALL CROFT (Chadburn)

CLASS VIII *b*.

The following varieties were grown and are retained :

BLITHESOME (Connell)
BRITONESS (Dykes)
FLAVILLA (Dykes)
HUNTER'S MOON (Tomalin)
MALTA (Pilkington)
KENYA (Pilkington)
PORRIMA (Bunyard)
W. R. D. × G. P. B. (Baker)

The following varieties have been relegated to the General Collection :

BOBBINGCOURT : 30 inches : June
HASSAN : 30 inches ; June
MRS. F. W. TOMALIN : 36 inches ; May–June
RHODESIA : 40 inches ; June
SARK : 42 inches ; June

BOOK REVIEWS.

" Alpine Flowers." From Water-colours by Paul A. Robert. Introd. by Prof. Carl Schroeter. 4to. 11 pp. 36 col. pl. (Batsford, London [1939].) 10*s.*

This is a charming picture-book, one of the Series " Art and Nature in Colour." The letterpress consists of a short but interesting introduction by Professor Carl Schroeter on the connexion between alpine flora, climate, soils and fauna, followed by brief descriptions of the forty-five plants represented in the thirty-six colour plates.

The plates are from water-colours by Paul A. Robert, a good name among flower painters, and very beautiful they are. The method of production is most successful, and each plate is a charming picture apart from its educational interest.

Carlina acaulis (pl. 15) is a lovely thing, and one can hardly credit it with the family's tetchy traits.

Clematis alpina (*Atragene alpina*) is another charming reproduction of a very amenable climber which should be a more familiar sight in our gardens.

Of the saxatile plants there are a number of engaging little portraits: *Ranunculus alpestris* and *Androsace helvetica* with a Draba growing near by, being particularly enticing. In plate 30, representing *Sempervivum montanum*, there appear to be two different plants bearing the same flower heads ! The one in the foreground is obviously *S. arachnoideum* ; perhaps for once the spider has been caught napping and the wrong fly has got into the net.

If one must find fault with this picture-book, it is with the arrangement of plates and letterpress; the former have only numbers underneath referring the reader back to the notes at the beginning which necessitates a great deal of turning to and fro which is tiresome. This volume should be welcome to the wanderer in the mountains who returns home with his buttonhole full of treasures—he may not be a botanist or a horticulturist or even the possessor of a garden, but just an intelligent individual who likes to know the name of a beautiful thing when he sees it.

LADY LAWRENCE.

" Seed and Potting Composts." By W. J. C. Lawrence and J. Newell. 8vo. 128 pp. Ill. (Allen & Unwin, London, 1939.) 3*s.* 6*d.*

Horticultural text-books are so numerous that it would seem that all phases of gardening had been adequately dealt with, yet this admirable little book must be one of the first to be devoted entirely to potting composts and one wonders why this important subject has been so neglected for, as the authors state, our methods of preparing composts vary little from those in vogue at the end of the last century and, as we read this book, the truth is forced upon us that we have depended too much on tradition and too little on experiment.

Some of the recommendations differ so much from the usual methods that some readers may consider them almost revolutionary, but it must be remembered that they are not mere suggestions but are recommendations based on the results of a long series of experiments. The idea of confining potting composts to a few standard mixtures is by no means new, for the system was used in a famous garden in which I served during the early days of my gardening career, and I became so convinced of its efficiency that I have practised it, more or less, ever since. The different composts were not, however, prepared for seedlings, and for adult plants, but they varied, chiefly in the percentage of humus, for soft-wooded plants, and for those having firmer growth, and although I have seen the excellent results obtained at the John Innes Horticultural Institution by the use of one compost for all adult plants, I still favour a second mixture containing a higher percentage of humus for plants having soft and delicate roots.

The practice of affording chemical fertilizers to seedling plants is a new one. The old tradition that manures were injurious to seedlings probably arose from the fact that the old school of gardeners looked upon manures, especially artificial ones, as stimulants rather than essential plant foods, and they would no more think of adding them to any compost intended for young seedlings than they would of dosing their children with whisky. Considered in their right perspective as well-balanced plant foods, it appears a perfectly rational thing to provide fertilizers, in a suitable form, in all stages of a plant's life, and Mr. Lawrence and Mr. Newell deserve the thanks of all gardeners for their experimental work in solving this problem.

The statement (p. 27) that " soil is not necessary ; and plants can be grown perfectly in a weak solution of chemicals " should not be taken too literally. A human being may also exist solely on chemical foods but, sooner or later, he will develop bowel trouble, and I feel certain that, if plants were compelled to exist solely on chemical foods and water, they would soon suffer from organic weakness. History has already proved that continued propagation from highly fed exhibition plants leads to constitutional weakness and a lower resistance to disease.

The chapter on glasshouse hygiene is full of good advice, especially for those who pride themselves on the cleanliness of their plants yet overlook the equal importance of hygienic surroundings.

Many gardeners have tried the sterilization of potting soils and have discontinued it because their results were not as good as they had hoped. The authors are evidently aware of this and have dealt with the probable causes of such failures in such a clear and understanding manner that some may be encouraged to try again.

This admirable book is worthy of a place on every gardener's bookshelf, for, although it may not be possible for everyone to follow the suggestions in their entirety, the advice on the preparation of correctly balanced potting composts is invaluable.

Mr. Lawrence and Mr. Newell are to be congratulated on the clear and practical way in which they have expounded their theories, and if they do not succeed in convincing the hardened sceptic, they have given him food for much serious thought.

F. C. PUDDLE.

" The Country Housewife's Handbook." Compiled by the West Kent Federation of Women's Institutes. 8vo. 219 pp. Paper covers.

This little book gives directions for the management of rock-gardens, orchards and the vegetable plot, for the apiary, poultry-yard, still-room and kitchen, and in so doing, achieves something of a miracle. In the domestic sphere it may be truly said to continue the record of distinguished achievement which has already been gained by West Kent members in Handicraft and in Community Service.

So far as the garden is concerned it might have been wiser to leave aside the more technical matters dealing with stocks and pruning, in order to allow more space for a description of simpler operations. Fruit varieties recommended here follow mainly after accepted standards ; but the choice of ' Sea Eagle ' as one of the peaches, and the recommendation of the Brompton stock for all peaches and nectarines is a slip to be remedied in future editions. Manures, fertilizers and composts are treated capably under this section, and the advice given will prove invaluable to all learners who have not been in touch with modern practice in this vital aspect of garden management. Gardening housewives will find a vast amount of useful information gathered together in a very small space.

Poultry is dealt with by experts, and the notes on keeping backyard fowls are both timely and helpful. Directions for the feeding of rabbits and squabs, valuable additions to home foods, may be hoped for in the next edition.

Keepers of poultry for profit will value the paragraphs on preparation of birds for table, and may will benefit by following the directions which insist upon " finish " as an essential for all sale goods. It has always been the policy of the Institutes to promote appreciation of style, through an intelligent application of the appropriate technique.

The Reformation, through a lessened demand for wax candles, not only led to the extinction of the " Church Bees " but robbed the countryside of a most valuable food resource. The waste of this potential reserve of sugar-substance is to be deplored, and " The Country Housewife " is worthy of strong support in its endeavour to increase the bee population of this Island, both in the country and in the town.

Cookery and the still-room recipes are varied and excellent, the skill of Institute members being recognizable throughout. There appears to be but one omission, that for curing ham and tongues. Such stores are particularly valuable at the present time, and it is fortunate that many housewives still consider the salting and smoking of meat as part of the routine of the year.

This most helpful and admirable achievement concludes with a modern touch by hints on tidiness, health and beauty.

L. Y. BUNYARD.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXIV Part 10

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September 15, 1939.

TO FELLOWS AND ASSOCIATES.

Owing to the outbreak of war the activities of the Society must necessarily be restricted. It will be appreciated that these circumstances have caused the cancelling of the Autumn Show and all future Shows for the present.

The Council is very anxious that the necessary increase of vegetable crops shall not entirely displace the ornamental aspect of our gardens. The mental refreshment and recreation which flowers can give us all will be a notable contribution to the national spirit, and the Council hopes that Fellows will remember the good work that nurserymen have done in the past, not only for the decoration of their gardens, but also in providing beautiful shows which they have all enjoyed, and that every endeavour will be made to help them to preserve their stocks by maintaining the usual flow of orders.

In respect of food production the Society has been in close communication with the Ministry of Agriculture and other technical institutions. A simple leaflet has been produced, and is distributed with this Journal, which will be a great help in making the best use of the vegetable garden. Existing vegetable gardens should be utilized in the best possible manner to maintain a supply of vegetables, and more intensive cultivation of this part of the garden will, in many instances, be more profitable than the breaking up of lawns and the conversion of borders for the production of food. A further pamphlet will also be issued which gives fuller details of cultivation.

The Ministry of Agriculture is setting up throughout the United Kingdom horticultural committees consisting of persons capable of giving horticultural advice including where necessary advice on the spot. In due course a list of these committees will be published. A panel of lecturers on food production is also being prepared and those requiring the lecture services are asked to apply direct to the Office of this Society.

So much for the immediate organization for the increase of food supplies, advice, inspection and lectures.

In respect of the other activities of the Society, the services of the Lindley Library will continue to be available for borrowing modern books *through the post*, but many valuable books have been removed elsewhere for safety. The advisory service will be continued and all inquiries should be addressed to the Director, R.H.S. Gardens. The distribution of plants will take place next year on the same lines as before. The Wisley Gardens will be open at the usual hours. The continuance of trials and of standard collections at Wisley is under consideration and every endeavour will be made that at least the permanent trials shall be maintained in order that the work of past years shall not be lost and will be available when hostilities cease.

As regards publications, it is proposed to carry on the JOURNAL as a means of communication between the activities of the Society and the Fellows. The exact form which it will take will be announced later.

The Daffodil Year-book which was complete at the time of the outbreak of hostilities has been published and can be obtained from the Office of this Society at 5*s*. in paper covers and 6*s*. in cloth binding.

The Lily Year-book, for which the whole of the copy is ready and partly printed, will be issued in due course.

The Horticultural Colour Chart, the second volume of which is in print, will be completed and subscribers will be duly notified.

The Botanical Magazine will be continued up to the completion of the present volume, after which the situation will be reviewed.

The preparation of the Dictionary of Gardening which is in hand will be continued and the supplement to the Index Londinensis will be published in due course.

The R.H.S. Diary will appear and it is hoped will prove its usefulness by its cultural notes. In it will be incorporated some of the particulars of the leaflets on food production mentioned above, but the dates of Shows must be cancelled.

Lastly, should circumstances allow, it is proposed to maintain the Examinations held by the Society.

The continuance of all this work will depend entirely upon the support of the Fellows. Our work is of national importance and the Council feels sure that this support will be regarded not only as a personal matter, but as a contribution to a great endeavour to keep Horticulture going in these difficult days.

F. R. DURHAM,
Secretary.

WISLEY IN OCTOBER.

THE outstanding features of the Gardens in October are the late-flowering perennial plants, of which Dahlias (weather permitting), Asters, and hardy Chrysanthemums are the chief, and in addition, the display produced by the tints of the trees and shrubs as their leaves and fruits become mature and prepare to fall. At the time of writing these notes the conditions are such as to lead us to expect an excellent coloration of the foliage this season.

On entering the gates visitors will notice the group of *Amaryllis Belladonna* below the south wall of the Laboratory—an annual and permanent attraction which never fails. Another large group can be seen at the end of the Award of Merit Garden on the bank below the large Crataegomespilus, and more bulbs are planted at the foot of the Rock Garden—another dry and sunny place for these South African natives.

Besides the trials or collections already mentioned in the opening paragraph late Roses and varieties of *Aster Amellus* may be expected if the weather is clement, as in 1938 both lasted well into October.

Adjacent to the Alpine house the autumn-flowering Crocuses are in bloom, including *Crocus laevigatus*, *C. speciosus*, and *C. nudiflorus*, but the Gazanias will probably have closed their brilliant flowers for the year.

In the Alpine house itself there is little to note, except perhaps that outstanding species from Macedonia, *Sternbergia colchiciflora*, with huge pale yellow cups, and the pretty little *Cyclamen pseudo-ibericum*.

On the Rock Garden there are not only gay patches of colour from the Cyananthus, Gentians, Polygonums, *Schizostylis coccinea*, *Nerine Bowdenii*, and other plants in flower, but also from the Japanese Maples, Clethra, *Osmunda regalis*, and more shrubs or plants which are found on the meadow or by the water-side. Passing down into the Wild Garden brighter tints are seen, particularly on the Hamamelis, Enkianthus, *Acer griseum* with peeling bark and smooth stem, the red leaves of *Disanthus cercidifolius*, *Lyonia* (*Pieris*) *mariana*, and species of Vaccinium which at this time of the year make the Wild Garden one of the most striking parts of Wisley, more especially as the ground below them is carpeted with *Gentiana sino-ornata*. *Cyclamen neapolitanum* will probably continue to push up its charming pink or white flowers, and the curious Tricyrtis from Japan blooms now.

That form of the Cornish Heath known as *Erica vagans* var. *rubra* is one of the latest to flower and a most excellent and vigorous plant, but in addition to it the double Ling ' H. E. Beale ' may not have finished its season, nor the long-flowering Connemara Heath, *Daboecia* *polifolia*, which was so beautiful in the Heath Garden in August. Few shrubs in Seven Acres flower now, excepting the purplish *Lespedeza formosa* and the bushy *Hypericum lysimachioides*, but many others are noteworthy for the colouring of their foliage or the profusion or brilliance of the fruits. Amongst the former we must include the Dogwoods, Maples, *Berberis virescens*, Euonymus, Rhus, Ribes, Viburnums, and *Parrotia persica*, besides the large tree of the Scarlet Oak near the eastern end. For berries the most outstanding will be amongst the Barberries and Cotoneasters, besides *Hippophäe rhamnoides* (the Sea-Buckthorn), and the black-fruited evergreen *Ilex glabra*, the Ink-Berry of the U.S.A. The wild Rose species should be especially rich in hips, and will be found along the river bank in Howard's Field.

So late in the year the herbaceous border will doubtless be rather past its earlier glory, but in the Award of Merit Garden is that unusual shrub *Schima argentea*, which is a relative of the Camellia and bears saucer-shaped white flowers in October, together with beds of the pink and very floriferous *Chrysanthemum rubellum*, the ' Black-Eyed Susan,' *Rudbeckia speciosa*, and Amaryllis already noted.

In the Temperate house the Fuchsias continue to give a good show of flowers, especially *Fuchsia parviflora* and the salmon-coloured hybrids of *F. triphylla*, whilst other shrubs in bloom are the orange Buddleia-like *Cestrum aurantiacum*, blue *Plumbago capensis*, and the royal purple *Tibouchina semidecandra* reaching almost to the roof. Nerines are about at their height now in the Half-Hardy house and are accompanied by Oxalis species, the yellow *Calceolaria Pavonii* trained along a support of the roof, and the enduring *Limonium roseum* and *Abutilon Milleri*, the latter with orange bell-shaped blooms.

PANEL OF LECTURERS.

During the ensuing months the calls upon the Society for lecturers on food production are likely to be very heavy. The Secretary therefore appeals to those gardeners and others, in all parts of the country, who have special knowledge of fruit and vegetable growing in gardens of all kinds, and are willing and able, without fee, to lecture on the subject to allow their names to be placed on the panel referred to on p. 442, so that their services may be utilized as required. Members of the panel called upon to lecture will be paid their travelling and out-of-pocket expenses according to a pre-arranged scale.

Names of those able to respond to this appeal for essential service should be sent together with addresses and notes of qualifications and experience to The Secretary, R.H.S. Offices, Vincent Square, London, S.W. 1., as soon as possible.

Several have already signified their willingness to act and the Council is deeply grateful for their offer of assistance.

FUCHSIAS.

By A. K. Fincham.

[Read July 18, 1939; Mr. A. D. Cotton, O.B.E., F.L S, in the Chair.]

When I was asked some months ago to come and give a talk on the Fuchsia and was also informed that the Fuchsia Society had been started, I personally was very much delighted because I have all my life been a grower more or less connected with the Fuchsia and remember it in its heyday. I saw its decline in favour and regretted it. Although I still grow many thousands each year I deplored the fact that it was going out of favour, largely due to the fact that so many other good things have come to the front, both for bedding and also for decorative purposes. Fashions change, and that also has a lot to do with the decline of the Fuchsia in the favour of the public. But a society for it is on the right lines to bring it into favour again. Nothing it seems to me to-day can flourish in public opinion unless it has a society to back it up and a nucleus of those enthusiasts to boost it at every opportunity and bring it before the public.

I cannot talk at all scientifically about the Fuchsia. I can only talk as a plain man who has been a grower of it for a great many years. I can go back to quite a toddling child and remember many things about the Fuchsia. One of the impressions of my early days is at school. A lot of us boys and girls in the winter time used to be invited to what has just been resurrected—a Spelling Bee. They were very popular in the country villages in those days, and there was great competition and boys and girls were keen to outdo each other. I remember on one occasion, the girls were wiped out early in the competition, unfortunately for them, and the boys only remained until there was one other lad and myself. It was given to us to ask each other a word to spell. He gave me an astonishingly long word, but somehow I scraped through, and then it came to my turn and I asked him to spell "Fuchsia." He went down.

In those days the builders had sense enough to put good wide window-sills in all the rooms in the house, whether it was a cottage or a mansion. Every window in the villages had a sill. You could not pass one of those windows but you saw two or three varieties of Fuchsia growing there. They were extremely popular and they excelled as window dressings. But you must have the window-sill. The builder that came after did away with the inside sill and put one outside, and the most modern builder has scrapped both.

I want to speak first of all about the varieties. I have been downstairs and had a good look at the collection there. Well, I can't say much about that. I will tell you what they look like—they all look hungry—as if they had not had a good feed for weeks! And the Fuchsia, like you and me, does like a good meal. But there is a very good lot of varieties, so do not despair. But my mind goes back to the varieties that we used to grow, and there is nothing there to touch the old ones except two that are more modern than the others I know—'Ballet Girl' which came in about 1893 or 1894, and then we have what is known in Covent Garden Market as the 'Pink Ballet Girl.' Of course Covent Garden favours the plain names. The variety downstairs called 'Fascination' has been called for years 'The Pink Ballet Girl.' I don't know why, but I think it was called that because it competed with the 'Ballet Girl' in favour in Covent Garden, and it was also a double one. Only those two of your more modern varieties do I know much about, but there is one there which I have known under two or three names. In past years it was called 'Display.' To-day it is called 'Achievement,' but in the days when we used to grow it in tens of thousands it was called 'Monarch.' It is the same variety. It is one of the greatest varieties in cultivation if grown properly and looked after year after year. It is possible to make a plant as high as this ceiling. I can look back to the days of the flower shows that held the public in the suburbs of London, when the Royal Horticultural Society used to hold meetings in the old Drill Hall, when the London nucleus of horticulture was centred in its suburban shows—Richmond, the Crystal Palace, Stoke Newington and numerous others—where there was good strong competition and the Fuchsia was one of the finest things of any at those shows. I remember when I was appointed foreman in the greenhouses at Orleans House, Twickenham, occupied then by the late Mr. WILLIAM CUNARD, I had a big disappointment and a surprise. The head gardener there said, "You know, I have no time much for flowers." He was a big fruit man. "If you like to do anything in the way of showing with the things that are available and the glass houses that are available to grow them in, you can get on with it." I had a faculty for growing. There was quite a good collection of Fuchsias and they were fairly aged plants, so I set about them and grew them on as I had been taught, and eventually, the second year of my work there, some of them were plants 6 or 7 feet high, and I thought that the day had come when we could take half a dozen of them and compete. Really they were nice plants, but we were not in it. We were nowhere. The specimens there came from all over the country in old covered vans, drawn by horses along the road for days and nights, from the North and the South and the East and the West. There were some Fuchsias there 15 feet high. They were over the edge of the great big pots and tubs they were in. They were all tied to a central stick. If your Fuchsia Society can resurrect anything like that in the little time that I have now got to live, well, nobody will be more delighted than I shall be. If I can be of any assistance I gladly will because I think it is one of the finest flowers we grow, either in our greenhouses or outside.

The varieties that I know particularly well I mention. I can assure you they are very good.

In the Reds I have already mentioned the one 'Display,' because that is the name I know it by best. It is the same Fuchsia as 'Achievement.' Another companion to it, also a Single Red, a bit more prolific than 'Display,' is called 'Scarcity.' If there is any scarcity it is the leaves and not the flowers. It is one of the best growers, one of the earliest to flower—in fact, one of the best red Fuchsias that there is in cultivation.

Then, with the white corolla and the red sepals, 'Ballet Girl' is, to my mind, the loveliest of all the Fuchsias, and quite distinct from 'Phenomenal'; both are the same colour but while 'Ballet Girl' is a splendid variety in all respects, 'Phenomenal' is a wretched flower. It is rightly named. It never did make a bit of good growth in its life, and to get flower you must have growth. And there is one very old one that we used to grow in tens of thousands forty years ago for Covent Garden, called 'Miss Marshall.' It is also a double, about half the size of 'Ballet Girl,' and still grows into a glorious specimen if properly treated.

For red sepals and pink corolla, I know nothing like 'Fascination.'

Then red sepals and purple corolla, doubles—there is one called 'Try Me O.' It is a beautiful flower and also a good grower. You must remember that to see the flower of the Fuchsia do its best you must have good free healthy growth, and there are so many I think of the old ones, and it looks to me of the newer varieties, that have not got that freedom of growth which means a good flower. Of these I name two: 'Crown Prince of Prussia' and 'Crown Princess of Prussia,' of the same colour but with a large single bell. The best one of the whole singles in that colour that we used to know years ago is 'Improvement.' I cannot tell you where you can get these varieties now, but it is possible that some nursery in the United Kingdom will publish a list and we will find these are also obtainable. Get all the lists you can, and you will probably find some of these good old varieties.

Then of the varieties with violet corolla and tinted sepals, of beautiful shapes, there are only two varieties I know that are really good. One is 'Lady Heytesbury.' Then after a number of years there came an improvement on this. Those two fill all the picture that is needed for that particular variety and shade of Fuchsia.

Then we come to the only one that I think is worth growing, with white sepals and pink corolla, single, 'Mrs. Marshall.'

That is all that I need say about the varieties. You have others here, and it is up to you to try to get on with them.

Now let us start with the cuttings: it is quite possible that there may be someone in this room that knows more about Fuchsias than I do, but I do want to talk as if we knew nothing. The earlier in the year a Fuchsia cutting is rooted the better. That is a deciding factor. If you can get the old plant after Christmas to start and break into growth in a little warmth you can get the cuttings off with a little heel as soon as they are an inch long and insert them in any soil as long as there is plenty of sand and they get the heat and the warm atmosphere. We have got a batch off the same plants for twelve years. There must be plenty of warmth and moisture and plenty of inducement for the plants to grow and give us all the cuttings they can in January, and from January to the flowering period each cutting has all those months to make growth, and it makes the growth before it makes the flower, which is necessary if you are going to have good flowers. Of course, the cuttings, once potted into small pots, need a fairly good loam on the heavy side, leaf mould and rotten manure or peat mould. A little bone meal needs to be added to give it some food-giving value, but as soon as ever the cuttings show they want to be potted up in a fair bit of warmth. Give them larger pots until they begin to show flower. When they are about 4 inches high you must stop them. The longest progress will show at the bottom joint, and so on to the top, and you will grow a nice plant in the pyramid shape. In the old days we grew tens of thousands in 5-inch pots and we used to reckon on getting ten or twelve or fifteen breaks, and usually when the plants flowered we had a beautiful shape. It did all that in the space of three months. It is one of the quickest growing plants there are and the quicker they are grown the better flowers you get all the time.

Now concerning the old plant: To get big specimens you must have old plants which want rest. When they have done their period of flowering at the end of the year they want gradually drying off. Don't go away for a holiday and leave your Fuchsias to look after themselves for a fortnight. Try and get a neighbour to give them a drop of water. Don't forget them. If you do they will have their own back on you. You know Prof. HUXLEY once said, ' Nature does not know anything about forgiveness of sins." If you do the wrong thing by Nature she will have her own back to the uttermost farthing. You must look after plants every day and all day. But after the last flowering period is over, say about November, you can gradually dry them off and give them a rest. Then, if you want them for growing on, you can bring those plants on gradually after Christmas, but they must be cut back. If you are going to make a specimen you must keep on cutting them back to within three or four joints from where they started to grow the previous year. In January, shake every bit of soil off them, don't damage the roots, have a nice bit of soil mixed up and get the roots into the smallest pot in which you can get them without breaking them. Directly the new roots which they will form in a little warmth in a week or ten days are on the sides of the pot, get them into a bigger one—that is, always a pot in which you can get half an inch of fresh soil round the old. You can go on year after year following the same process with your plants until they get great big trees.

When I first went into Covent Garden in 1886, I should think that any morning in May at a rough guess there were 10,000 plants of Fuchsias in that Market, and large quantities kept on until the middle of July, and they were all sold every day. They went all over the British Isles, and some even to the Continent. On the stands of the late Mr. ROBERT LAWFORD of Bexley Heath every morning on every tier were many, many pots of Fuchsias, and some of them had six, eight, ten and up to twenty shoots, and they were all tied to a stick in the centre. In those days there was no raffia as we know it. We used to buy old Archangel mats and use them for tying. ROBERT LAWFORD tied all his Fuchsias with black cotton, and I have been told his daughters used to tie most of them.

Now about tying. If you will go down to the Hall you will see Fuchsias tied there as I mention, with split raffia and each shoot lifted to one of the split strands. But you can see all the raffia. The proper way to tie them is so that you cannot see the raffia at all. That can be done to specimens 10 feet high. But to ensure that your tie is not seen, you must loop your shoot to it before the buds are as big as a small pea. If you leave it any later you will see the ties. But they will make sufficient growth and bloom head to hide every tie you put on. As they grow the tie will straighten itself out, and the plant, if it is tied properly, will always be a perfect shape.

I have just thought of two old varieties I have omitted to mention : there is one you have downstairs called 'Mrs. Rundle' and there is another one that is not there, called 'Beaconsfield.' It is a longer bell than 'Mrs. Rundle' and has a beautiful round green leaf. That is a glorious Fuchsia.

Now I have said all I can or have time for about growing the Fuchsia and I briefly want to tell you something about its use. There is not a solitary place in the garden but what you can grow Fuchsias. You can grow them in the sun, in the shade, in your window if you have a proper window-sill, and you can grow them in vases and in window-boxes. Yesterday, when passing between two of my greenhouses, I noticed that the old stock plants of our 'Ballet Girl' had been stood out in rows along the ends of the greenhouses and the back of the sheds to look after themselves, with a bit of food and water, and those Fuchsias had no growth on them worth speaking about when they were put out there. They have grown and they have got growths a foot to 18 inches long, and the ends of those greenhouses and the back of the sheds which would have been a row of weeds a foot high have no weeds but are a glorious mass of beautiful Fuchsias.

I wish some of you, if you want to know something more about Fuchsias, would get up one morning about 4 o'clock and go to Covent Garden Market at 5. We have still a few good growers, though nothing like forty years ago. But there are still one or two splendid growers of Fuchsias. I was looking at those of a firm from Potters Bar in the market this morning and they were a solid mass of flower.

You can get some glorious stuff on this beautiful plant if you would only grow it. It is one of the easiest plants to grow. It does not seem to mind the soil. Some of you are more familiar with Cornwall and Devon than I am, but some years ago I went there, and in every village there was a collection of Fuchsias. Of course, in that climate they do not need to be protected. They simply go to rest on their own and start to break away again in the spring. But if you have a nice south-west corner in your house, then take my tip and plant a Fuchsia, and if it needs training up a wall, well buy a bit of trellis work and tie the Fuchsia to the trellis, and it will be a joy to you as long as you like to keep it.

If you are in a part of the country where frosts are severe, there is nothing wrong with hanging up a sack or any piece of old canvas so that it hangs down in front of your plant. It will give it all the protection it needs. Don't be afraid to prune in the spring. Cut the Fuchsias back to one or two eyes of the growth they have made the previous year. I had a lesson on this. At home we had a few of the old type of hardy Fuchsias around the house. They are quite nice short varieties for rockeries. But you know the old red type of hardy Fuchsia. I was up in a little village beyond Kyle and Loch Alsh, north-west Scotland, and a man had quite a long hedge of the old hardy Fuchsia. He had used the shears on his hedge and cut them down to within 18 inches of the ground every year. The stems were as thick as my wrist, but the growth had come up finely and made a lovely hedge as long as this lecture room. I have seen scores of hedges and plants left to grow just as they like, and they do not do a quarter as well as that hedge.

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In reply to questions the lecturer said the best thing is to feed the plants with a really good mixed fertilizer. Don't give them a lot at once, and the best time to give it is when the soil has got dry. Give them the fertilizer and then fill the pot or tub with water.

They like bone meal. We vary our fertilizers. We never trouble what we give to them, so long as it is a good general fertilizer.

Farmyard manure, well rotted and dried and rubbed into the soil, is an excellent thing, but when a plant is growing and vigorous it requires something quicker, and that is where the fertilizer comes in.

Well-rotted cow dung is very good for Fuchsias during their growth. It is cool and the Fuchsia does like a cool place to root, but do not give overdoses of manure.

I do not favour autumn cuttings myself. You have to look after them all the winter and they hang about and seem in the way. A nice soft cutting after Christmas is best, and then every day, as the light grows stronger, so does the cutting. Light is life to all plants. That particular cutting will overtake the one you have grown and rooted in the autumn and make a better plant in the spring. I am all in favour of spring cuttings taken as early as you like after Christmas, but not before.

Repeated shifts cause a lot of labour, but I do not know how to grow anything successfully without a lot of labour. You cannot get rid of that when you are dealing with plant life. I have always found that if the labour is put into any growth whatever, it will repay you afterwards. You know, to go to the finest authority, " Whatsoever a man sow, that shall he also reap." That applies to every phase of plant life in the world. The necessity for putting a Fuchsia back into the little pots is first of all to get rid of all the old soil which has been robbed of nearly all its nourishment the previous summer. Put it into a little pot of fresh rich stuff, but not too much to start with. The roots have to be all fresh. They come out from the old roots and enjoy that little bit of food just like a child. The roots are all eager, and every time they get a chance to get into something rich and fresh they seem to give another jump and they grow. That is all I can tell you, but I know it.

Each layer of new soil you put round it gets full of new roots until the plant shows bloom, and then there is no point in giving it more soil. Then is the time to apply the fertilizer, once a week. On the five-inch pot we always keep a lot of old teaspoons about, and measure a level teaspoonful and spread carefully over the five-inch pot, once a fortnight at first. But that is just a guide. You can start with a lower supply than that if you like, and if you find your plant is not growing as freely as you would like you increase the amount.

But there is one more essential point about plants in pots, and that is watering. Do you know there is one question I have never been able to answer. Sometimes friends come in and take away a plant with smiles. Before they get to the gate they ask, " Now, how often shall I water this ? " I can never answer it. You must be your own judge. It wants a good drink when it is thirsty. A small drink when it is not thirsty will do it more harm than good.

Liquid manure is good and there was a day when we were confined to that. I can remember the day when there were no very good fertilizers on the market and we had to use liquid manure. But it is a great deal of trouble. With a really good fertilizer to-day you can feed forty or fifty plants in about ten minutes.

When I had Fuchsias out in the garden on our nursery we used to plant our old stock of ' Ballet Girl ' along the side of the road. We never used to trouble about their getting frozen and the leaves shrivelled. That would put them to rest. If they went to rest in October we took them up as carefully as we could and put them into the smallest pot and stood them where they were protected from the frost. They can't stand too much but a little really sends them to rest. They are such vigorous plants. A Fuchsia will throw two great big clumps of bloom in the short months of our summer, and the sooner they go to rest after that the better.

A GARDEN IN COLORADO.

By Miss MARY W. ROGERS.

WHEN we decided to make a garden in the Rocky Mountains, at an elevation of 7,000 ft., we set ourselves a difficult task. None of the usual garden routine is possible. The winter lasts for about six months, there are snowstorms and frosts both before and after, so that practically all garden operations are crowded into June, July, August and September. The ground is frozen solid all the winter and baked as hard as cement all summer, while spring is so short it seems a matter of days.

The big log-cabin is on a gentle slope falling to the east in a clearing in the forest. The trees are nearly all Douglas pines, though some way below the house is a grove of blue Spruce, where in summer one could find the lovely *Calochortus Gunnisonii*. The primeval forest had been felled for timber about eighty years earlier, so now it is mostly of secondary growth, with a few old giants of great character, which had been spared because their growth was not sufficiently straight. Undergrowth is almost non-existent ; all is an open park land with grass like fine hair, full of wild flowers. Only where the hillsides are bare of trees can many shrubs be found.

A reservoir had been built higher up the mountain, and on a flat between it and the house a kitchen garden was already cleared. So, early in June, as soon as a plough could be worked, our vegetables were planted. Peas, tomatos, egg-plants, spinach, beet, carrots, parsnips, squashes and potatos were set out and grew with lightning rapidity. The seeds were up in about four days and everything grew visibly. We had just enjoyed our first dish of green peas when disaster overtook us. On June 29 a thunderstorm visited us, first torrents of rain then hailstones as big as naphthalene balls. It only lasted three-quarters of an hour, but that was long enough. Every tree was weighed down with ice and the vegetable garden looked as if a steam-roller had passed over it. The row of peas was represented by a green streak in the earth. Everything was hammered into the ground, and not a leaf was left on our two little apple trees. The root vegetables survived but peas, tomatos, egg-plants and squashes were all gone and we had none for the summer. Seed potatos were washed from the hillside and across the road. Such deep gulleys were formed in our front drive that when the collie jumped down into one to drink from a pool a plank laid across from side to side would not have touched her, while the mud at the bottom of the hill was 18 inches deep.

After this catastrophe it was too late in the season to sow more vegetables so we turned our attention to making a flower garden below the house. This was not so simple as it sounds. First of all there was the question of temperature. The difference between day and night is enormous, frequently 50° Fahrenheit, sometimes more. We were about the latitude of Lisbon but the great height made the days cool. Even in summer the thermometer was seldom much above 80° in the shade, but night frosts begin in August, so that several times there was a range of from 20° to 80° in the course of 24 hours. In winter the shade temperature is always below freezing (it may drop to – 40° F.) but the sun is quite warm. Only plants brought up to such conditions are hardy enough to withstand them. We could not attempt to raise our own seedlings. Labour is very scarce and only the most constant care can bring seedlings through their first winter as the weight of the snow is very great in that still air. I have seen it piled a foot high like a wall on a railing three inches wide, and there it stayed for days. Even the tiniest twig has to bear a huge weight for its size, so we had to start with plants and shrubs big enough to care for themselves. It is very unsafe to bring up plants from a lower level. Even ANDREWS' nursery garden at Denver (altitude 5,000 feet) is too low. His stock had come from the high mountains, but a residence in that somewhat less rigorous climate had weakened them so that they refused to live if brought back to their native haunts or, rather, so few survived that it was not worth while planting them ; but with plants from our own neighbourhood or from the higher mountains we could be sure of 50 per cent. surviving and with luck we might rear 75 per cent. These we had to collect for ourselves. It was much more interesting than writing an order to a seedsman, but it took longer.

We escaped one trouble of many English gardens, for there was no wind to guard against. We were on a clearing in the middle of a forest of *Pinus ponderosa,* 60 to 80 feet high, and though we sometimes heard a wonderful organ note of wind in the high branches, only breezes reached the ground level. More cheering still, the hungry snail and predatory slug were alike unknown. It was far too dry for them. We were on the eastern side of the Rocky Mountains, and that meant that we had to depend on the winter's snowfall for moisture, rain, except for an occasional thunderstorm, being almost unknown. The native plants are accustomed to this, and will send roots 30 feet deep in search of moisture before they begin to make much growth above the ground. A miner's pick is the only possible digging tool, as no fork can pierce the solid earth. It is quite impossible to get to the bottom of the roots of a shrub only a foot high. If we could get down two feet in that rocky soil we thought ourselves lucky. Rocky Mountains is certainly the right name for them ! However, we managed to collect plenty of dwarf junipers, the taller kind known locally as cedars, a white-flowered dwarf Ceanothus and the 'Mountain Mahogany' (*Cercocarpus parvifolius*).

The plan by which we kept the transplanted shrubs alive for the first season or two was a simple one. As we had our own reservoir we were able to carry pipes down through the garden. At each clump of shrubs a standpipe was led off, ending not with a tap but with a nut, which was not quite screwed home so that a tiny drop fell every second or two. This did not waste a great amount of our water, but it just turned the scale between life and death for the shrubs. One drip in the centre of a group of three or four was enough to keep them alive till they had sent roots down deep enough to reach the natural water level. Two years of this treatment seemed to carry them past the danger stage.

We wanted to provide a place where plants needing more moisture than this could live, so below the terrace on which the house stood, a triangular piece of ground was dug out to make a sunken garden. The deepest excavation was about six feet, but even at that depth the soil was full of grass roots. In the centre we made a circular pool, lined with stone, six feet wide and eighteen inches deep. This was filled by a central pipe which could throw a thin jet of water ten feet high if turned full on. Cracks were left between the top row of stones, so that water could seep out into a bed two feet wide, where we could grow plants needing moisture. Round this bed was set a three-foot wide paved path, with wee rock plants in the interstices. The water would pass beyond this, and keep the rest of the sunken garden fertile.

The bed round the pond was the hardest to fill as we had to go so far to find any water-loving plants. Many streams were so subject to sudden floods that their banks were almost devoid of herbage, but a drive of twelve miles, to the ten-thousand-foot level, produced some fine clumps of Monkshood six feet high, a white one among them. A shorter trip gave us Golden-rod, water Mertensia and a tall Delphinium, while eighteen miles in another direction brought us to Stagshorn moss, various Saxifrages, a pretty-leaved Heuchera and two kinds of Coleanthus, a composite with flowers like hanging tassels of gold or white and, lastly, a wonderful treasure, two tiny ferns. Colorado possesses 2,900 wild flowers but only 29 ferns.

When the pond bed was furnished we started on the drier part of the garden. Set flower beds were out of the question—the soil would dry too easily and also it is almost impossible to dig out individual herbs. So we used turf, not our English idea of turf, but turf in the Colorado sense, more flowers than grass. Blue is the predominating colour, first the blue of a bluebell wood—sheets of *Pentstemon gracilis*—then forget-me-not blue, a tiny Mertensia, locally known as 'Chiming Bells' (? *Mertensia lanceolata*). Later came small bushy Lupins, Larkspurs, and *Clematis Douglasii*, in neat tufts eighteen inches high, covered with opulent hanging bells of blue and purple, also a tall, shrubby Pentstemon as vividly blue as *Gentiana acaulis* (? *Pentstemon glaber*), and most glorious of all, *Aquilegia caerulea*, growing three feet high with flowers three or four inches across. Gold was represented chiefly by *Thermopsis montana* and *Dryas Drummondii* until late summer, when Golden-rod, Sunflowers, Gaillardias, Rudbeckias and other composites provide a riot of colour. *Gilia aggregata* gave tall spikes, generally white but running through every shade of pink to deep crimson, while the various kinds of Castilleja have bracts of brilliant scarlet, crimson or yellow. Mauve tones come first from the little silvery-leaved *Pentstemon secundiflorus*, and later from many kinds of Aster. Yarrow has become quite acclimatized and is far handsomer than in England, forming sheets of white or pink, and here and there one finds a curious Borage, *Krinitzkia virgata*, with foliage as bristly as the most militant thistle and white flowers. Bulbs are scarce; in earliest spring there is the delicate Leucocrinum like an ethereal white Crocus, and in summer the exquisite *Calochortus Gunnisonii*, white or palest lilac, with markings of apple green and black. But these are only a few of the many hundreds of flowers which bloom in such profusion that each in its turn seems to fill the whole landscape while the air is scented with pine-needles and 'Mountain Sage' (*Artemisia frigida*).

My share of the work was to search the hillsides for specially flowery patches and send the ranchman to plough these out with the deep plough. The turves were then set all round the rest of the sunken garden. Our old gardener was an ex-grave-digger and an expert at laying turf. After he had finished one piece he assured us that "no grave could look better." Enough moisture spread from the pond to make everything grow rampantly, so that the venture has proved a great success and the garden is full of pleasant surprises.

The banks surrounding the sunken garden (fig. 101) were planted with shrubs, dwarf Juniper, wild Roses a much deeper pink than Dog-roses, with much bigger flowers, clumps of white Clematis—we went twelve miles to find that—and kinni kinnick (*Arctostaphylos Uva-ursi*). They were much easier to get than the flowers. It was just a matter of searching the hillside for suitable bushes, tying a white rag to those chosen and sending a man to being them in. Two little flights of stone steps lead up from the sunken garden to a big terrace which runs along the south side of the house. It, like the lower paths, is laid with crazy pavement, and has plants between the stones. From the lower end of the sunken garden a wide path bordered with dwarf Yucca (*Yucca glauca*) leads down to the drive and groups of shrubs continue for some distance down the drive.

As the flowers pass the shrubs come into their own. Every branch of currants is smothered in tiny, transparent fruit of the purest scarlet, looking like wee gooseberries, but so tasteless that the birds despise them so that they retain their beauty for weeks. *Jamesia americana* turns deep crimson with cream-coloured undersides to the leaves and cream-coloured heads of flowers like miniature hawthorn, while *Cercocarpus parvifolius* is completely covered with the long silvery twisted plumes of its achenes till it glistens in the sun. With the first night frosts every tiniest plant dons autumn colouring, even the dandelions and sorrels turn a vivid crimson, while the leaves of the white-stemmed aspens turn the borders of the forest a deep gold the colour of a gorse moor. The only thing to be done now for the garden is to empty the water-pipes so that the frost may not burst them, and to go out after each heavy fall of snow with the longest broom-handle to free small shrubs and saplings from the masses of snow which would quickly break them.

Inside the house the great branches we had picked from the aspens kept their golden leaves all the winter, and we also had bunches of a tiny golden dwarf everlasting flower whose name I could not find in any of the few botanical works we possessed. Out of doors, dandelions managed to bloom in sunny spots till the end of November. It is curious that this exotic managed to beat the native plants: I was told that it reached the mountains as a weed of cultivation. Then snow covers the earth till the end of February, when wild candytuft and a curious dwarf, pinky daisy brave the cold and cheer the gardener's heart with the thought of the glories that are to come.

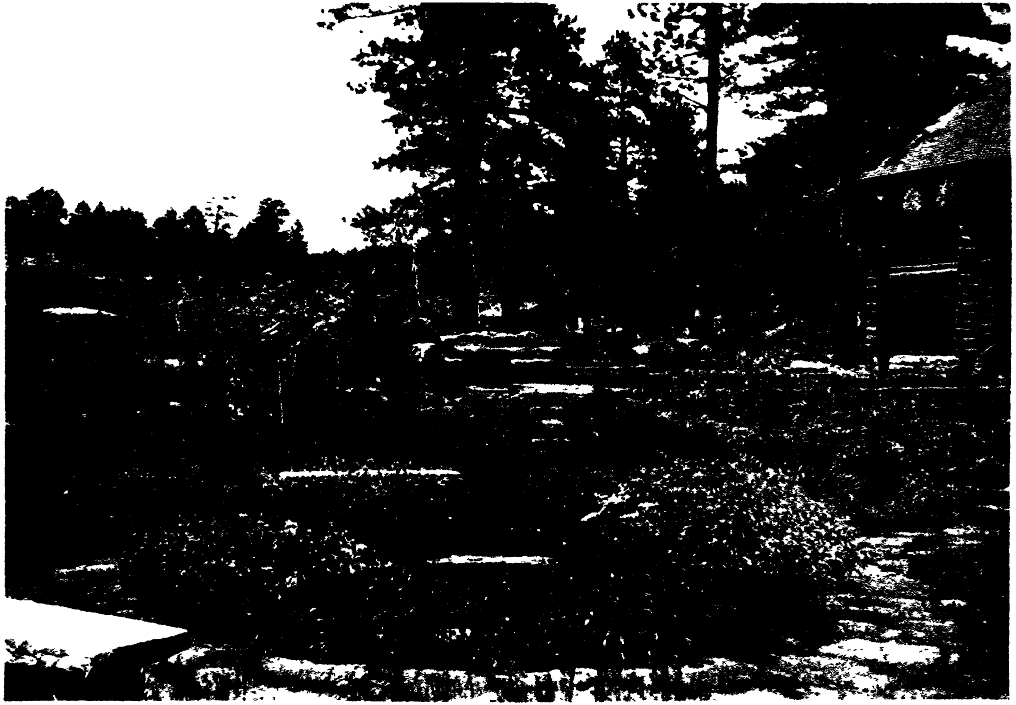

FIG 101 —MISS ROGERS' SUNKEN GARDEN IN COLORADO AFTER TWO SUMMERS' GROWTH

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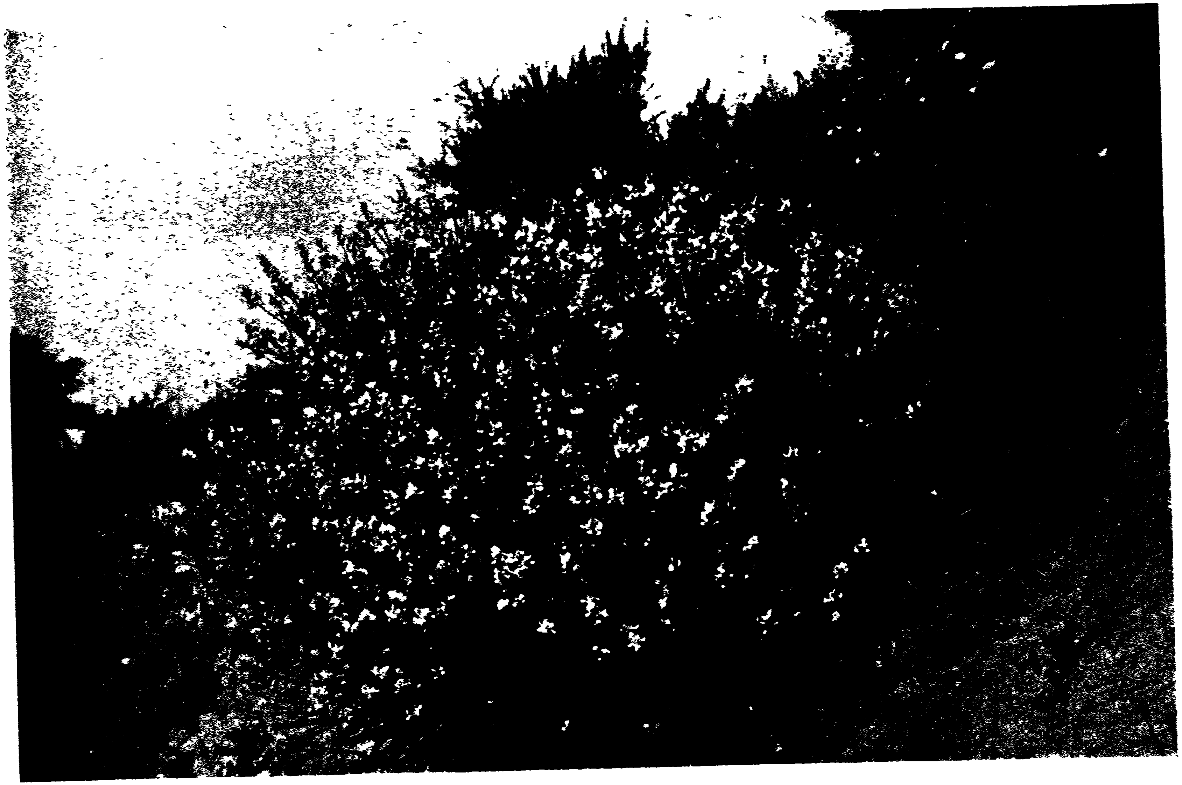

FIG. 102.—SPARTIUM JUNCEUM ON A DRY BANK

SHRUBS FOR LATE SUMMER EFFECTS.

By Michael Haworth-Booth.

Most of us have little difficulty in arranging a brilliant display of flowering shrubs in the spring and early summer. It is in the later summer that we are apt to find it difficult to maintain the standard of splendour of the colour effects we have enjoyed from the Cherries of April, the Azaleas of May, and first from the hardy hybrid Rhododendrons and then the Roses in June.

For some years I have relied exclusively upon shrubs for garden effect and perhaps an account of some of those that have proved effective may be of interest. For this special purpose I do not think that any shrub that is not good to look at at twenty yards distance is of very much use to us. Thus many charming little species whose beauties are only appreciable on a very close inspection have to be ruled out. Again, those garden varieties whose flowers have been enlarged to the point where the strength of the stem is insufficient to hold them in their proper position when subjected to wind and rain will be too unreliable in their deportment to be of service. Hardiness, at all events under the conditions of our own particular garden climate, is a very desirable feature ; the plant should be reliable enough in this respect to be capable of giving us a good show of bloom three seasons out of four at any rate. Conditions vary so much that gardeners are best advised to make their own individual tests for hardiness. Several of the shrubs recommended, though hardy enough in Sussex, may be dangerously near the borderline in the North.

It will be realized that to provide the same wealth of colour in July and August as in May the same number of July shrubs and also of August shrubs will have to be accommodated somewhere. This may cause complications and difficulties with regard to space. In such a case probably the best plan is to make a critical survey of the existing plants in the garden. Very often such an examination reveals that there are many large old shrubs that are not really pulling their weight, and their removal and replacement by more brilliant late-flowerers will enable a great improvement to be made to the garden as a whole. As an instance of this kind I remember a garden which though quite attractive in spring became merely a dull, shabby, unrelieved green from midsummer onwards until September, when there was a certain amount of autumn effect. The chief cause of this state of affairs was found to be the presence of considerable numbers of inferior Barberries and Cotoneasters of species of minor decorative value. The whole lot of these was removed bodily and their places taken first by half the number of more effective autumn shrubs and trees such as *Acer palmatum* var. Osakazuki, *Rhus Cotinus foliis* *purpureis*, and *Stranvaesia Davidiana*. Then the remaining spaces were filled with late-summer-flowering varieties. The result was an immense improvement through the summer and even in autumn.

As the dull period usually begins in late June I will begin with the shrubs flowering then. The little Rock Roses, garden varieties of *Helianthemum Chamaecistus*, etc., will still be making quite a colourful display and provide excellent material for massed plantings on dry banks or ledges in the rock garden where a low-growing shrub is required.

There are numbers of fine new varieties with picturesque Scots names, with a wide range of rich colourings. Of these I find the vivid orange ' Ben More ' particularly free in flower and growth, whilst the Sassenach section has a notable representative in the lovely ' Watergate Rose.' As regards cultivation the quick drainage of an elevated position and liberal use of the shears after flowering appear to be all that is needed. So far as arrangement is concerned, rather than a medley of different tints, groups of half a dozen of one variety will provide a much more brilliant effect.

In lime-free soils we may enjoy the delicate charm of *Kalmia latifolia*. It makes a fine, dense rounded bush as a specimen evergreen or it may form the background planting of a bed with earlier or later flowering shrubs in front, but the rather shy-flowering nature of the plant and the weak tone of the white or pale rose flowers when viewed from a distance prevent it being of much use for colour effects.

The Mock Oranges, or Philadelphuses, will still be in bloom and their fragrant flowers are often of beautiful form, but I must confess to finding them a singularly difficult family as regards selection, placing and cultivation. The garden hybrids are often ugly in their habit of growth, even the popular *P.* × ' Virginal ' showing a lack of form which is, to me, a perpetual disappointment. Then, again, in a rich, deeply-dug sandy loam, unless the flowered wood is cut away at ground level the moment the flowers fall, the free-flowering qualities of some of the other varieties leave a good deal to be desired and the foliage is by no means distinguished.

Some of the species are attractive when reduced by pruning in the manner described to mere flowering sprays. *Philadelphus Satsumanus*, for example, makes new shoots over 6 feet in length, in a rich soil, which are boldly decorative when in bloom. Other species, such as the better forms of *P. Delavayi*, usually form shapely floriferous bushes without any pruning at all and are particularly valuable as they flower later, in July. About the twentieth of the month that most lovely shrub *Cornus Kousa* comes into flower. It has the very highest qualifications in almost every respect. It is at all events hardier than most of the other species of its race and, though it is not more beautiful than is *Cornus florida* on American soil, in my opinion it far surpasses it in the English garden. The graceful arching branches of this small tree are often so densely covered with blossom that, over areas several feet wide, I have been unable to find any space between them. The shape of the white bracts that make up the "petals" of the inflorescence varies somewhat. In the finest form I have seen, of which there is a fine tree about 17 feet high at Grayswood Hill, the bracts are of a beautiful, even, diamond shape instead of the more common formation with a long ragged point. Either type of the true Japanese species is, in my opinion, vastly superior to the variety *chinensis* which (though the individual flowers are larger) appears somewhat coarse, and altogether lacks the refinement of form which is the great charm of the species. It will be remembered that Major STERN reported at the Shrub Conference that *Cornus Kousa* would support a limy soil though slow to "get away."

With a shrub producing a mass of white flowers such as this, a complementary planting of rich colour is desirable. For a soil so fortunate as to be free from lime an excellent choice would be that delightful coral-salmon evergreen Azalea commonly known as *macrantha* (*Rhododendron indicum*). It flowers exactly at the same moment, in my experience, and is apparently as hardy, as the Kurume Azaleas. As these can be satisfactorily grown in Yorkshire its possible range is quite a large one. In a soil too limy for the Azalea a few specimen bushes of such shrub-Roses as 'Nur Mahal' or 'Zephyrin Drouhin' would form a pleasing contrast and, like the Cornel, remain in beauty for nearly a fortnight.

July is the flowering time of what is surely the King of the Broom family, the Spanish broom (*Spartium junceum*) (fig. 102). It does not care whether the soil is limy or not but if it is to become the splendid shrub that it should be its position must be carefully selected and it must receive proper pruning. It is best to grow it as a specimen and to give it as open and sunny a position as possible and a poor, well-drained soil. In spring, before growth starts, the rush-like stems that bore flowers the previous season should be sheared back so as to encourage a compact globular form. If left to its own devices it often grows up tall, gaunt and shabby and soon catches the wind with fatal effects. A well-grown specimen often produces a succession of its glorious scented yellow pea-flowers throughout the month.

For all but very limy soils there are few finer shrubs than the Hydrangeas (fig. 103). In the South there is but little need to go further than the fine garden varieties with large heads of sterile pink or blue flowers. With these inexpensive plants superb colour and landscape effects are easily arranged that rival the spring effects of the Rhododendrons and Azaleas. They are plants of the open sea coast, seldom free-flowering unless grown in the sun with a good mulch around the roots to retain sufficient moisture to quench their remarkable thirst. For the more highly-gardened places near the house the Hortensia types are admirable and for more naturalistic situations the variety *Mariesii* with only a smaller number of the showy sterile flowers will be found very suitable. Almost as fine in flower and much more vigorous and splendid in its growth is the hardier *Hydrangea macrophylla* var. *normalis* of Wilson. Though often confused the two plants are easily distinguishable in the garden. The variety *Mariesii* is a cultivated form, like the sterile-flowered garden form *H. macrophylla*, that has to stand as the type of the species and has the same growth and habit; the inflorescence is characterized by the presence of numerous abortive sterile flowers of various sizes scattered about the umbel. The variety *normalis* is the wild form common on the Japanese littoral; it makes a large rounded bush perhaps 6 feet high and 8 or more in diameter. It flowers noticeably later and the sterile flowers are to be found only in a marginal ring around the umbel. This wild Hydrangea is, I think, if we exclude the Eucryphias as trees, the finest August-flowering shrub that I have seen. A specimen of the sub-variety *caerulea*, which turns a particularly vivid blue, is still a magnificent sight on this last day of August as I write. If the climate is too cold for any form of *H. macrophylla* the varieties *japonica* or *rosalba* of the hardier species *H. serrata* might well be tried. In any case they are delightful shrubs with crimson-flushed flowers of pronounced Japanese atmosphere. If lime is present, the species *H. aspera* can be tried; it is quite an attractive plant with bluish flowers and leaves densely downy on the underside, but it lacks the brilliance of the varieties previously mentioned.

Another fine member of the Broom family also flowers in July, *Genista aethnensis.* It makes a large bush, sometimes nearly 12 feet high, though usually the wind will have pushed it over before it reaches this height. It makes a great number of very slender branches and the innumerable tiny yellow flowers upon them make an airy cloud of colour. Like its relative the Spanish broom it will grow as well on lime as on the acid sand. It is often difficult to start and I have sometimes had seedlings die from no ascertainable cause, otherwise it seems perfectly hardy. *Ceanothus* 'Gloire de Versailles' usually flowers a little late for it, otherwise this would make a delightful colour combination.

Where a smaller growing broom is required our native *Genista tinctoria,* sometimes known as the Dyer's Greenweed, provides a very brilliant and pure yellow, There are three forms of this plant; a double-flowered variety which is a compact small grower of little more than alpine-shrub size, then the normal wild form which reaches about 2 feet in height and is an excellent shrub for massed plantings, and there is also a gaunt tall form, known as the variety *elatior*, which requires a great deal of care in staking and is, I think, the least attractive of the three. This broom often suffers from aphis very badly and so it is a good plan to look over the bushes occasionally and spray them before it gets out of hand.

There is no shrub whose lack of hardiness I deplore more sincerely than that of *Plagianthus Lyallii* (fig. 104), for it has all the charm and refinement of form of the daintiest Japanese Cherry, coupled with a delicious fragrance that scents the air all around. Last winter's sudden vicious frosts crippled many bushes severely; and in one or two cases where I had neglected to take the essential precaution of early hard pruning to induce a suckering habit, with many stems springing

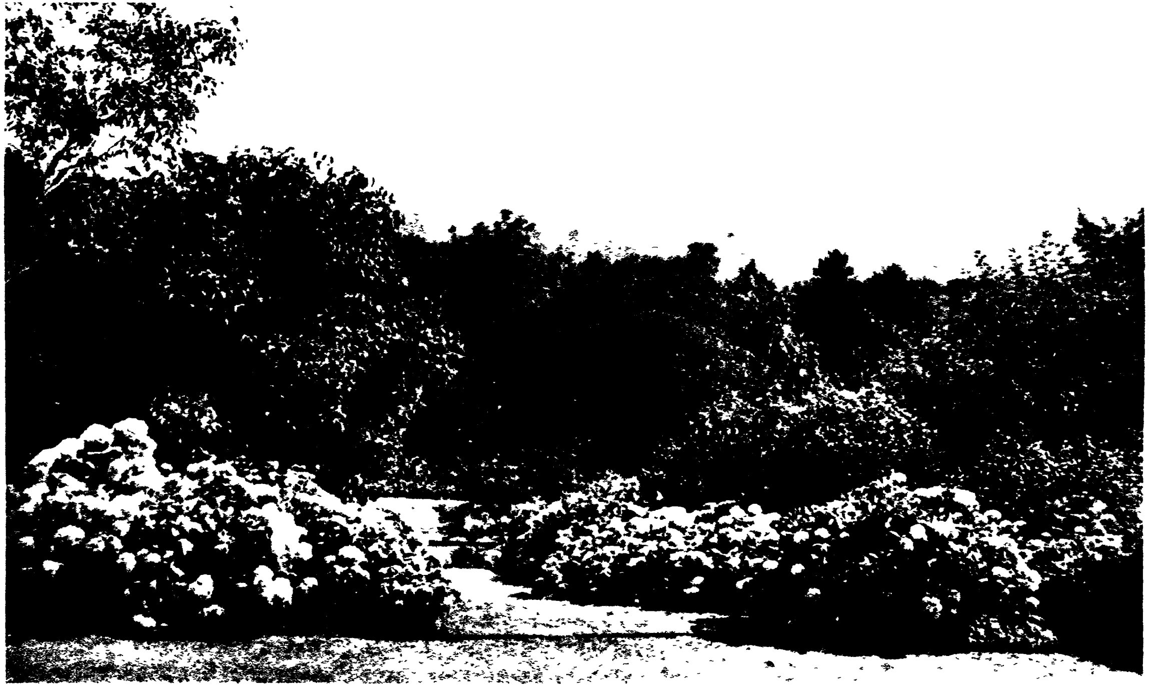

Fig 103 —Hydrangea macrophylla at Grayswood Hill

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FIG. 104.—PLAGIANTHUS LYALLII

from the base, the damage to the bark near ground level may well prove fatal. At the moment these single-stemmed trees are just hanging on to life but make no move to put out strong fresh shoots from the roots like the cut-back plants. None the less this is one of the few tender shrubs that I feel that it is really worth while persevering with, for the reward of bringing a good specimen to full flowering size is high. As a foil to the dainty white bells of the Plagianthus I have another shrub of doubtful hardiness, that holly-like South American with the vivid orange trumpets, *Desfontainea spinosa.* It is hardier than its New Zealand neighbour but only just. It seems to prefer richer, moister and shadier conditions than the sunny, airy spots apparently most favourable to the Plagianthus which, by the way, has no objection to lime. The Desfontaineas in the wood-garden have done so much better that all are to be transferred there this autumn.

When August comes the Hydrangeas and Spanish broom will still be decorative and will probably last for some time yet. But a new series of shrubs is coming into bloom and most of these last flowerers of summer will last until autumn begins. Whether the soil is a limy or a very acid one seems to make no difference to *Fuchsia Riccartonii.* It is a splendid garden shrub (fig. 105) for rich colour effects in late summer and altogether more vivid in colour than the even commoner *F. gracilis.* An excellent feature is the fact that there is probably no shrub that strikes more certainly from any cutting of a half-ripe shoot merely stuck into the ground where the soil is on the sandy side. Thus, provided one has an old plant in the garden somewhere, new plantations can be made wherever required with the least possible labour. So rampant is the growth of this Fuchsia on a rich light soil that it is almost best to grow it in beds to itself for it soon buries anything near it. It seems only to require a sunny place where the worst of the cold winds are kept off it. For the first time for about ten years here the stems were killed to near ground level in some cases last winter, but this is no disadvantage because in any case it is best to remove last year's growth in spring as by doing this you get a better, thicker, mass of flowers.

The pictorial value of the main colour groupings is greatly enhanced by the addition of plants whose form has a distinct architectural appeal. Several members of the Spiraea family are outstanding examples of this type, such as the graceful *Spiraea Aitchisonii* or *S. discolor.* When many specimens are carefully placed at suitable points to link up the plantings the effect is a very fine one, though often of regrettably short duration. A pleasing diversification of such an effect may be made by the addition to the arrangement of a specimen or two of *Buddleia Davidi nanohensis.* This variety has a more refined and shapely habit than the commoner form and also tends to avoid the unsightly appearance so often caused by the presence of browned, dead flowers on the panicles which so frequently detracts from the beauty of the original type.

For gardens where the soil is acid and sandy there are few more delightful August-flowering dwarf shrubs than *Erica cinerea*. It is the most brilliant of all the Heath family for colour effects in the garden landscape. Though it grows itself from seed by the acre within half a mile of the house I have not been successful in raising it in quantity by that means in the garden. As it is a plant that needs to be planted by the hundred to show itself at its best this is to be regretted but at least it transplants very readily and can be purchased very cheaply in its wild form. The named garden hybrids are even richer in colour than the type but are of course considerably more expensive.

Escallonia Iveyi is a useful white-flowered evergreen usually at its best about the middle of the month. It has, to my mind, a better habit than most of the Escallonias and is a good wind-resister though it does not last very long in bloom.

I think the high spot of any garden in August would be attained if one could contrive a good tree of one of the hardier Eucryphias, either *Eucryphia glutinosa* or *E.* × Nymansay (fig. 106), arising like a fountain out of the pink carpet of the Heath. Of these two Eucryphias, if it is necessary to make a choice I should select 'Nymansay,' as it seems a better grower and the glorious white flowers are, if anything, even more beautiful in form, whilst the noble columnar evergreen habit of the tree is finer than the more open-topped shape attained by the deciduous *glutinosa*. But it would be a pity indeed to be restricted to only one species, for 'Nymansay' comes into flower just as *glutinosa* passes its best and is in its turn succeeded by the more delicate but very lovely *E. cordifolia*. And *E. glutinosa* itself will have been preceded by the exquisite fragile blossoms of *E. lucida*. 'Nymansay' and *cordifolia*, alone, are said to be able to grow in limy soil. I do not think I have seen any flowering tree of any kind produce such a mass of flower, in proportion to its size, as the fine old specimen of *E. glutinosa* at Grayswood Hill. Like *Spartium junceum*, *Cornus Kousa*, *Hydrangea macrophylla* var. *Mariesii* and *Plagianthus Lyallii* it is not a case of having to put up with them because they flower late—even if they flowered amid the riot of colour of May we should want to grow them for their own intrinsic beauty and charm. Their late blooming is an extra quality that adds to our pleasure by prolonging the sequence of fine garden pictures.

There are several minor shrubs that flower late and, though not sufficiently vivid to provide any real effect in the landscape, they are nice to have for odd corners. *Caryopteris* × *clandonensis*, a sage-like shrub with small lavender-blue flowers, is one of these; the specimen here came from Wisley as a small cutting three years ago and is now a compact flowery mound 30 inches high by some 60 inches in diameter. Then there is *Hibiscus syriacus*, like a shrub-Mallow, with open trumpets of white, pink, or lavender-blue according to variety. It forms a sturdy symmetrical bush but requires plenty of sun to bring on and ripen its growth. In those seasons when we are favoured with an Indian Summer it makes quite a display until the advent of colder weather puts an end to it almost overnight. A fine effect of richer colouring is provided in September by the second flowering of the admirable hybrid-musk Rose 'Nur Mahal,' which makes fine groups of separate specimens for lawn use. For growing as flowering shrubs in this way the Bourbon Rose 'Zephyrin Drouhin' and the China Rose 'Fellemberg' are only very slightly less effective owing to their weaker colouring, and all will give at least a second display of flower just as summer ends, which point we have now reached in this late summer calendar of flowering shrubs. The pruning of specimen shrub Roses is a matter worthy of care and thought, for rather than the few specimen blooms on strong stalks usually desired our objective is the exact opposite. It is therefore not surprising that the required result, that of a twiggy hemispherical bush with a large number of relatively small flowers on stalks thin enough to let them bend over just sufficiently to enable the blooms to show us their largest surfaces, is most easily attained by doing the precise converse of the " Instructions for Pruning Exhibition Hybrid Teas." That is to say, we shall zealously preserve all the thin twiggy branches and keep stopping-back, so as to induce them to branch at once, any strong shoots that may appear. That the Rose prefers to grow as an isolated specimen shrub is strongly indicated by the remarkable health and freedom from disease of the plants so placed and there will be little need for the frequent troublesome sprayings so often called for in Rose beds.

I am afraid that the species-minded gardener may well feel that in these notes I have laid too much stress on garden varieties. In reply I must plead that the temptation to profit from the patient years of hybridizing and selection by our predecessors has been one to which I have gladly succumbed rather than start at " scratch," so to speak, with original wild species. A convenient compromise can often be made by including in the planting a specimen of the original wild type in such a manner that while providing an object of interest it does not mask the more brilliant flowers of its garden offspring by its quieter form. As a matter of fact there are many instances where the positions are reversed, and the wild type is the better and more decorative garden plant. To mention only one, the wild type form of that excellent August-flowering shrub, *Hydrangea paniculata*, is, I think, much to be preferred to the garden variety *grandiflora*, which has lost both the fine erect deportment of the flower head and also its shapely form. With the wild type one is enabled to thin out the shoots so as to bring about a slight increase in the size of the panicles, secure in the knowledge that the stems will still be strong enough to support their weight under all circumstances.

Now real autumn succeeds late summer, and this article, with its subject, must come to an end, for the glory of the autumnal effects of berry and foliage is another story.

HENRY WISE AND THE ROYAL GARDENS IN QUEEN ANNE'S TIME.

HENRY WISE was born in 1653 of a Warwickshire family and died at the Priory, Warwick (which he had purchased in 1709), on December 15, 1738. He studied horticulture under GEORGE LONDON and became a partner in the great Brompton nursery, the largest and most celebrated of its time in London, with which he was connected for many years until about 1710. He collaborated with LONDON in the publication of The Retir'd Gard'ner (1706), which was a translation of two French books on gardening (Le Jardinier Solitaire by Sieur LOUIS LIGER) with a little added matter, and The Compleat Gard'ner, or Directions for cultivating and right ordering of Fruit Gardens and Kitchen Gardens (1699 and several later editions), which was based upon JOHN EVELYN'S translation of J. DE LA QUINTINYE'S book.

HENRY WISE counted for much in the English horticulture of his time, for he and LONDON directed most of the great gardens of England, Blenheim, Wanstead, Edger, Melbourne, and elsewhere, and WISE became deputy-ranger of Hyde Park and superintendent of the royal gardens of Hampton Court, Kensington, etc., under William III, Anne, and George I. He thus came in direct succession to the traditions of the great French gardener ANDRÉ LE NÔTRE, for the formal garden at Melbourne in Derbyshire had been laid out by ROSE, who handed it on to his pupil LONDON ; WISE remodelled Melbourne, but in his designs, for at least a part, used Versailles as a pattern. Hampton Court he also remodelled, supplanting the extensive gardens laid out by LONDON in the time of WILLIAM OF ORANGE, containing much box-edging and the like in the Dutch taste, by designs much of which may still be seen there.

By the kindness of Lt.-Col. H. E. DISBROWE-WISE, C.B.E., of Burton-on-Trent, we have been able to examine a large number of contemporary manuscripts from which the following extracts have been made. They are interesting in many ways, for they show not only some of the activities of HENRY WISE but throw light upon rates of pay, costs of work and plants, and so on, more than two hundred years ago when much of what we often admire now had its beginnings.

We have retained the original spellings.

The State of his Ma^{ties} Gardens Beginning March ye 29th, 1696.

	A yeare.	
To Jasper Frederick Henning Esqr per annu	100 : 0 : 0	Officers Sallary £440
To Wm Tallman Esqr per annu	140 : 0 : 0	
To George London Esqr per annu	200 : 0 : 0	
To Mr. Quillinburg per annu	70 : 0 : 0	Mr. Quillinburgs part for Hampton Court £530 : 2s : 8
One foreman att per annu	40 : 0 : 0	
4 men at each per annu £14	56 : 0 : 0	
5 men at each per annu £9	45 : 0 : 0	
4 men at each per annum £7 : 5s : 0d	29 : 0 : 0	
5 women at 8d per day each for ½ a yeare	29 : 10 : 8	
Board wages for 13 men at £15 per annu each	195 : 0 : 0	
Materialls per annu	65 : 12 : 0	

	A yeare.	
To Mr. Vanstaden per annu	70 : 0 : 0	Mr. Vanstadens part of Hampton Court is £402 : 18 : 4
4 men at £14 each per annu	56 : 0 : 0	
4 men at £9 per annu	36 : 0 : 0	
3 men at £7 : 5s : each per annum	21 : 15 : 0	
2 women at 8d per day each	12 : 3 : 4	
Board wages for 11 men att £15 each per annu	165 : 0 : 0	
Materialls per annu	42 : 0 : 0	
Mr. Jasper Gemprell per ann	40 : 0 : 0	Mr Jasper Gemprells part for Hampton Court £183 : 9 : 8
1 man at per annu	14 : 0 : 0	
1 man at per annu	9 : 0 : 0	
1 man at per annu	7 : 5 : 0	
1 woman at per ½ annu at 8d per day	6 : 1 : 8	
Board wages for 3 men at £15 each per annu	45 : 0 : 0	
Materialls and fireing per annum	62 : 3 : 0	
Bowling Green Keeper per annu	23 : 8 : 0	
Rowling horse per annu	24 : 0 : 0	
Mole Catcher per annu	16 : 0 : 0	
For dung mold and sand per annu	200 : 0 : 0	
3 men at 2s per day per annu	109 : 10 : 0	Grass and Graves att Hampton Court £358 : 13s.
3 men at 20d per day per annu	91 : 5 : 0	
4 men at 18d per day per annu	109 : 10 : 0	
4 women at £23 : 8s per annum amongst them	23 : 8 : 0	
for Materialls per annum	25 : 0 : 0	
Mr. Timbormans per annu	60 : 0 : 0	Mr. Timbormans part of Kensington £603 : 0 · 0
5 men at £14 per annu each	70 : 0 : 0	
7 men at £9 per annu each	63 : 0 : 0	
8 men at £7 : 5s per annum each	58 : 0 : 0	
10 women at £5 : 4s each per annu	52 : 0 : 0	
Board wages for 20 men at £15 each per annum	300 : 0 : 0	
Materialls	90 : 0 : 0	
To Mr. Kirke per annu	40 : 0 : 0	Mr. Kirkes part of Kensington £384 : 1 : 0
2 men at £14 each per annu	28 : 0 : 0	
1 man at £9 per annu	9 : 0 : 0	
5 men at £7 : 5s per annu	36 : 5 : 0	
Board wages for 8 men at £15 each per annu	120 : 0 : 0	
4 women at £5 : 4s per annu each	20 : 16 : 0	
For Materialls per annu	130 : 0 : 0	

An Abstract of the State of the Royal Gardens and plantacons in his Late Majesty King Williams Reign Anno. 1699.

	allowance P ann.		
	£	s	d
Hampton Cot.	1623.	4.	0.
Kensington	1129.	0.	0.
The Royal Gardens	525.	10.	0.
St. James's House Garden	91.	5.	–
Richmond	75.	–.	–
Windsor	25.	–.	–
Officers Sallerys	500.	–.	–
To Artizans as Brick Layers Carpentrs. Plumbers etc. to keep althings in repair	831.	1.	–
To the Earl of Portland as Superintendant	200.	–.	–
	£5000.	0.	0

The Number of Acres contain'd in the abovesaid Gardens amounted to about 74 for which the Earl of Portland was allowed by Contract with the then Lords of the Treasury 5000 £ p Ann.

The Allowance of 5000£ for 74 Acres according to Computacon amounts to 76£. 11s. p Acre.

* * *

Whereas the sum of six thousand pounds was lately derected to be Issued to you att ye Rec$^{t.}$ of Excheq^{er} by one hundred and fifty pounds a week to be reckon'ed from ye 1st of Feb: last upon acct. for Extra^{ry} Workes perform'd and to be perform'd in his Majestyes Gardens att Hampton Court, ye Lords Commission^{er} of his Majestyes Treasury Comand me to signifie to you, that ye sd. six thousand pounds is Intended to be applye'd and pd. over by you to Mr. Henry Wise for ye particular workes undermentioned, which are perform'd and to be perform'd in his Ma^{tys} Gardens and Parkes att Hampton Court and amount according to his Estimate thereof to about six thousand, six hundred thirty eight pounds, fourteen shillings and threepence, that is to say—

	£	s	d
For the Levelling, workeing and planting y^e Quadriangle Court in y^e Building by him Estimated att ..	107	5	0
For levelling workeing and planting y^e Great walks before y^e Building, y^t is from y^e Thames South to y^e Road North to Bushey Parke North	865	1	0
The 2 devisions of Gardens to be made, y^t lye on each side of y^e great Partarre Garden. Levelling workeing & planting	772	0	0
In y^e great Partarre to lay with Gravell & Grass to y^e vallue of	200	0	0
In y^e wilderness to Gravell Turfe and Sand to y^e vallue of....................................	200	0	0
The new planting of trees in y^e Little House Parke ..	220	0	0
The Charges of planting all y^e trees in Bushey Park Gravelling y^e great Avenue of sixty foot wide digging and makeing y^e Bason and other workes	4102	16	3
The Charges of watering all y^e Trees that have been planted this year and y^e Last	171	12	0
	6638	14	3

But you are to take care that before ye sd. full sum of six thousand pounds be pd. over for y^e use aforesaid y^e said workes be finish'd and admeasur'ed and y^e prizes adjusted by the officers of y^e workes,

I am Sr. Your Most Humble Servt.

Treasury Chambers Wm. Lowndes.

12 March 1699

Mr. Henning.

* * *

Severall Workes Performed for his Majestyes Service in his Life time, In y^e Trenching, New Makeing, and Planting, a Devision of Ground by y^e New Wall, and against y^e Wall, being in Length 3500 foot, and in Width 26 foot, and Planting Large Shapt, Spruce Firr Between y^e

Lines of Elmes, Limes, and Horse Chestnutts in his Majestyes House Parke att Windsor, it being Performed in a very Wett time and was done with great Charge.

by Henry Wise.

fr. Sept. yᵉ 12th 1701 to Mar. yᵉ		£ : s : d
19 : 16 : 00	There is Trenchd, and Wrought, next yᵉ New Wall 264 Rodd, being wrought a foot and an halfe deep and ye gravelly Earth taken out at 2s. per Rodd is	26 : 8 : 0
164 : 15 : 10	Dug, and Carted to this Devision of ground that was Trenchd up next yᵉ New Wall for a Plantation of fruite Trees etc. to Raise yᵉ Ground with good Earth where wanted and to Carry yᵉ Lines of this and yᵉ Quick hedge Border thro: yᵉ Low grounds that is by being Raisd to a Levell was Carted 2825 Solid yards of Earth yᵉ meane distance of its being Carted being 600 foot, yᵉ Charges of Carting this Earth, Spreading and Workinge it with all Charges Containd at 15d. per Yard is......	176 : 11 : 3
24 : 4 : 00	Fruit Trees planted in this devision of ground. £ : s : d 90 Peach and Nectron Trees at 2s. 6d. ......11 : 5 : 0 36 Best Plum Trees at 12d................ 1 : 16 : 0 72 Cherye Trees at 6d. 1 : 16 : 0 12 Apricock Trees at 12d................. 0 : 12 : 0 90 Vines at 6d. ...... 2 : 5 : 0 130 Pear Trees at 12d. 6 : 10 : 0	24 : 4 : 0
83 : 6 : 0	Planted in yᵉ Lines Between ye Large Forrest Trees 238 Large Spruce Firrs that are Clipt and Shapt into a Pyramid Forme and is 8 or 9 foot high yᵉ Charges of yᵉ trees diging yᵉ holes 12 foot wide & planting yᵉ Trees at 7s. per tree	83 : 6 : 0
8 : 0 : 0	Alsoe 32 Spruce Firrs more that yᵉ holes were not dug soe much yᵉ Charges of yᵉ Trees, diging yᵉ holes & planting at 5s. per tree	8 : 0 : 0
20 : 5 : 0	270 Large Basketts that yᵉ Trees were planted in at 18d. per Baskett	20 : 5 : 0
19 : 0 : 0	The Charges of Land and Water Carryage to Windsor with these Firs, each plant being in a Large Baskett with their Earth to them being 2 wagon Loads & 2 Barge Loads	19 : 0 : 0
339 : 6 : 10		

223: 2: 6	Dug up and Carted to Raise all ye Low ground where these Firr Trees are planted, some of y^{e} Places falling out in such Low Parts of y^{e} gravele Pitts that caused y^{e} ground to be Raised 7 foot high and ye necessity of it was being y^{e} Plantation was Orderd to be Carryed to a Levele or neare it by Reason of y^{e} Canale that is to be made, and y^{e} Rubbish that comes out of this Canale is designed to fill up y^{e} Remaineing Part of y^{e} gravele Pitts soe that there is dug and Carted to Raise y^{e} ground and to make seats for y^{e} Planting of these Firr Trees and in Repaireing Severall of y^{e} Banks that this Last Winter floods had washed away y^{e} ground being not soe well settled before y^{e} floods came y^{e} whole is 3570 Solid yards y^{e} meane distance of its being Carted being 1000 foot at 15d per yard is	223: 2:6
7: 0: 0	For 40 Load of Rotten Dung for y^{e} Borders under y^{e} Wall at 4s. per Load is	8: 0:0
7: 5: 6	There is 97 Rodd of ground Trenchd & wrough 2 foot & ½ deep for y^{e} Planting a White Thorne hedge being Trenchd and Wrought at 2s. per Rodd is	9:14:0
20: 11: 6	Planted in this devision of trenchd ground 41150 Plants of White Thorne, ye Charges of ye plants trimming them, and makeing them Ready for Planting and Planting them all Charges Cont: at 12d. per 100 Plant is	20:11:6
257: 19: 6		
339: 6: 10		
597: 6: 4		

* * *

On May 19, 1702, the following, signed by F. W. SEYMOUR, was sent to Mr. HENRY WISE from St. James's Palace.

> "It is Her Majesty's pleasure that you forthwith repair to the Lodge in Windsor Park, late the Earl of Portland's, and take into your care and charge the House and Gardens thereunto belonging. And all persons concerned are to give obedience to Her Majesty's pleasure. This I am commanded to signify."

Mr. WISE soon got to work and prepared a scheme for the gardens in his charge which is set out below.

Cockpit Treasury Chambers 28th July 1702 Forenoon.

Present

Lord Treasurer Mr. Chancellr.

Mr. Henry Wise Gardner called in In pursuance of the Queens Pleasure My Lord Trearer agrees with the said Henry Wise on her Ma^{ty} behalfe That he shall have and receive 1600£ a Year

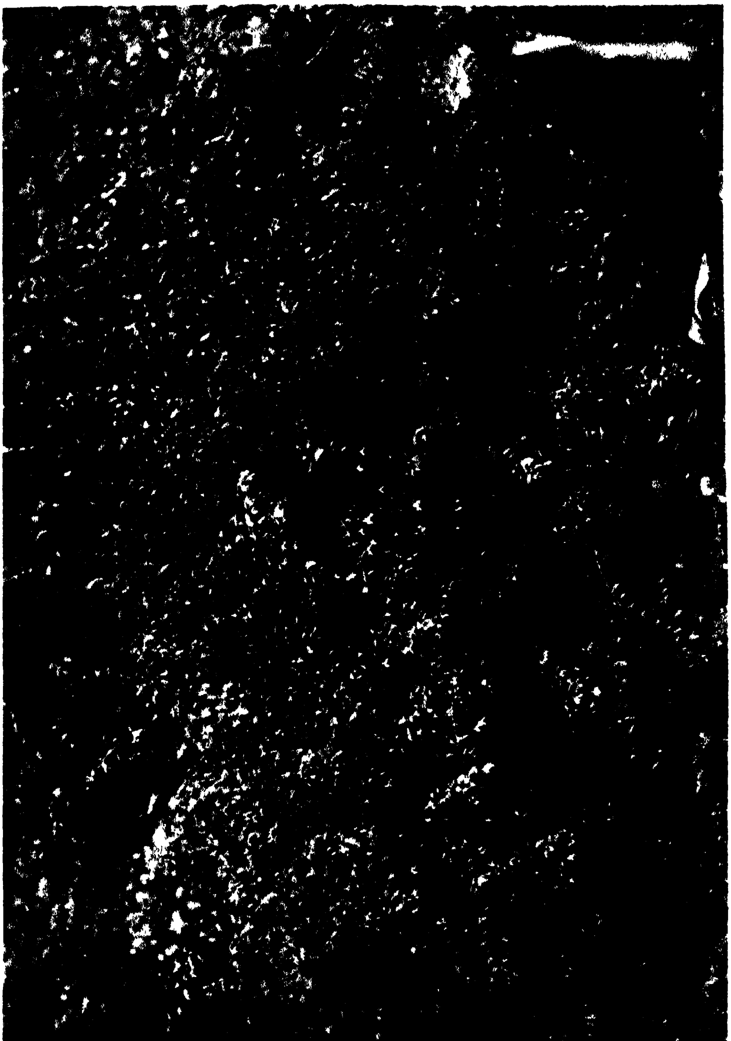

FIG. 105.—FUCHSIA RICCARTONII

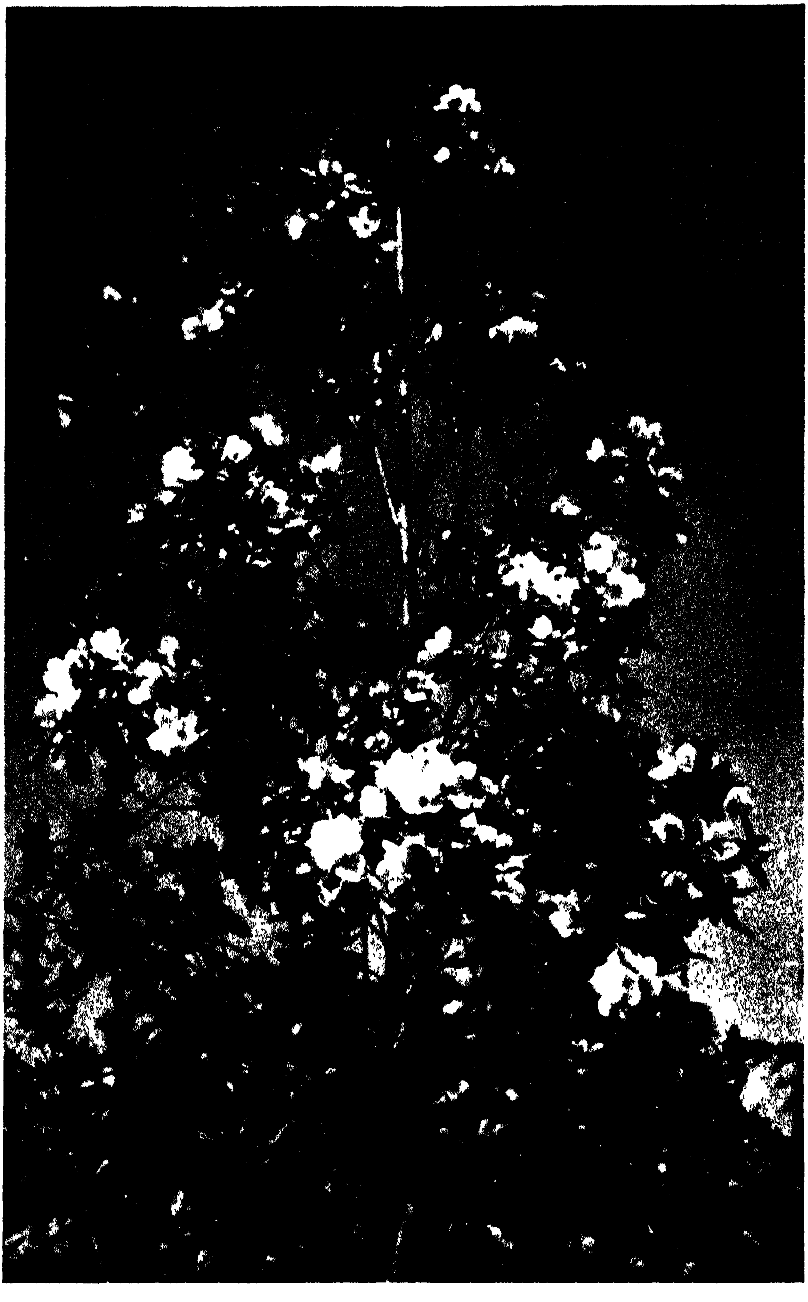

FIG. 106.—EUCRYPHIA × NYMANSAY.

from the first day of August 1702 by equall Quarterly Payments out of the Office of the Workes for keeping all her Ma^{ty} Gardens & Plantacons at Hampton Court the Great Plantacon on the North side of the Castle at Windsor the Garden at the Lodge in the Great Parke—these, and all the Gardens and Plantacons of her Ma^{ty} at Kensington (Except the Kitchen Garden and the Slip of ground that goes round the Meadow there) and to find all things for keeping up the said Plantacons and Gardens according to a Scheme thereof to be signed by him, and the said Henry Wise agrees to keep the said Gardens and Plantacons accordingly.

Henry Wise

This is a true Copy

Ex.^{d} J. Taylour.

A Scheme of Her Maty's Several Gardens & Plantacons as now kept up, and as each Division dos require to be upheld, & is undertaken to be kept.

Hen. Wise.

August 2d. 1702.

Hampton Court	The Great Fountain Garden to the North East front of the house, & the two Ends North & South Wilderness & new Grove Privey Garden to the South front Glass-case Garden & Pheasant Yard Quadrangle & Prince's Court	The Grass to be mow'd, Swep'd & rowl'd, the Gravel rowl'd & weeded, the borders dung'd, dug, hoed, rak'd & weeded, the Sevl hardy Evergreens & other Plants to be stak'd, ty'd up, prune'd & clip'd & to keep in good order the Sevl Collections of hous'd Greens & flower roots.
	Kitchen Garden & fruit Gardens in 6 Divisions Melon Garden	To be dung'd, dug & crop'd wth: the sevl: varietys of Eatables most proper for her Maty's use, & the Trees prun'd & nail'd.
	The Great Terras wth: its Divisions The Bowling Green with its Walks	The Grass to be mow'd, Swep'd & rowl'd, the Gravel rowl'd & weeded, (but as it is a sort of Gravel yt came out of the Thames 'twil not bind to be kept fine) & the Evergreens to be kept clip'd.

Hampton Court—*continued.*	Lower Wilderness & Plantacons	The quart: & Sand Alleys to be kept clean from Weeds & the Hedge Lines clipt.
	House Park Bushey Park	The Avenues of Trees to be prun'd all the Young trees planted since ye Year 1699 yt shall happen to dye to be made good by planting others in their places & to catch and keep clear only ye House Park of Moles.
Kensington	The Long Terras to the North Bowling Green Garden of Dwarfs Long Walk at the head wth: the Sevl: Divisions down to the Canal The old Ground as now made, & when finished to be kept in Good Order The Divisions of Houses & Greens	All wch: to be kept in good order by the Grass being rowl'd, mow'd & swep'd; the Gravel rowl'd & weeded; the Borders dungd, dug, hoed, rak'd & weeded, the hedge lines clipt, the Sevl hardy evergreens & other plants stakd, ty'd up, prun'd & clip'd, the fruit trees prun'd & nail'd & the sevl Collections of hous'd Greens & flower roots to be well manag'd & kept in Good Order.

The Kitchen Garden & Long Slip round by the Wall to be excepted, & is not Contained in the Works to be performed, & not any Kitchen Garden Crops raised in these divisions of Gardening; They being that part wch: was laid downe by the late King, only the Old Gardiner had his Allowance of 40 £ a Year Salary, wch: is not taken Notice of here.

The Great new Plantacons at Windsor to be cultivated & managed as follows

Windsor.	The Border next the Wall where the fruit Trees are planted to the Wall & also the other border where the dwarf fruit trees are planted at about 25 foot distance from the Wall, both wch: borders are to be kept clean from weeds & cultivated wth: dung as often as it is necessary for the benefit of the Sevl. fruit trees. To

Windsor—*continued.*

clip once in a Sumer all the Spruce firs that are planted & Growing between the Sevl. Forrest trees, as the Elms, Lymes & Horse Chestnuts, also to keep clean from all Great Weeds, that may annoy or hurt the Stools, as the tops of the roots of all the aforesd: forest trees & Spruce firrs, also the line of Quick that's planted at a distance from the Wall and Pale round the Greatest part of the s^d Plantacon to be kept clean two Years from Weeds, afterwards to be clipt once every Sumer, all wch: sd: Works to be well perform'd as the Season of the Year will admit, & as each division shall require.

Windsor to ye house in the Great Park.

The Sevl Gardens as now made, & are now kept up at this time, to be look'd after in all those works as before menconed, finding & providing the sevl: working Tools & Materials as is expres'd for the Sevl: other Gardens, dung only excepted, being always made at the Stable to the House, for it is impossible to have dung for the Gardens any other ways than from what is made at the Stable.

Newmarket

The Several little Gardens as now made & planted to be Upheld & kept in good Order.

An Accot: of the several Tools & Materials that are to be provided and found by the undertaker vizt.

Spades
Rakes
Reels
Lynes
Sheers
Hoes
Trowels
Pruning hooks
Pruning Knives
Skreens
Wire Sieves

Wooden Sieves
Wheel-barrows
Dung forks
Water-barrows & Straps
Water Tubs
Jetts
Watering Pots
A sort of Engine to sprinkle the sevl: trees & plants
Edging Irons
Paring Irons

Groves
Sithes & Rubbers
Hammers
Nails & List
Baskets
Grindstones
Pickaxes
Hand Spikes
Brooms
Bass Matts.

Also at his own proper cost & charges to make good the sevl: Plantacons of Fruit trees, forest trees, flowering shrubs & hardy Evergreens that shall at any time happen to dye by planting others in their places (but for all potted & tub'd plants, that is, all plants that are usually growing in Tubs, Pots or Cases & kept in the Greenhouses, Glass-Cases or Stoves to be Excepted, as also the large lymes in both the Parks) also to find & provide horses to rowl the sevl Gardens, & to provide all sorts of Dung & Earth for the Hous'd Plants, & dung for the several Gardens.

For the performance of all the aforesd: Works, finding & providing the sevl Tools & Materials, together with the making good all the sevl: plantacons as aforesd: is to be paid to the aforesaid Henry Wise the sum of Sixteen Hundred Pounds P. An. at four Quarterly paymts: that is four hundred pounds a quarter commencing from the date aforesd: to be paid out of the Office of the Works & to pay the same fees as the sd Office pays to the Exchequer.	£ 1600

Memd: That this Agreemt: has no relacon to the Altering or new making any part of the Gardens, but to keep up what is already made, that is to be performed at her Maty's Charge by the Office of Works. The Repairs of all the sevl: Houses, Glass-Cases & Frames, all flower Sticks painted & plain (that is without being painted) all Tubs & Pots for the Orange Trees & other plants & flowers, all Carpenters Bricklayers Plumbers, Masons, Smiths & Glasiers Works to be performed at her Maty's charge & is not contained in the Contract of 1600 £ P Ann.

Also all the fruit & herbs that the Gardens do produce, that her Maty shall think fit to be carryed from Hampton Court to Windsor, or from Kensington to Windsor, to be carryed at her Maty's Charge. That the sevl: Garden houses, sheds, or places of use, as now used by the Gardiners that the undertaker has them for the use of himself & his servants.

Henry Wise

* * * * * *

An Estimate of Severall Workes to be Performed for her Maty's Service in St. James's Parke in order to put ye same into better Order; by Planting New Trees where old ones are dead, Grubbing up ye Chestnutts that Injure ye Lymes, Pruineing ye Severall Trees that want it, Gravelling ye Severall foot Paths that are to be Gravell'd, Sowing of others with hay seed; and Cutting all the Ant and Mole hills and Casting them abroad.

Henry Wise.

	£ : s : d
For New Planting of 350 Lyme Trees in ye roome of those that are dead, of ye Largest size that can be procured out of Nurseryes being about 7 Inches in Circumference. First grubbing up ye dead Trees and their Rootes, then diging ye holes 10 foot wide and a sufficient depth. Carting of 6 loads of fresh Earth to each Tree wch: is to be dug in some convenient place in ye Parke, and carted one with another about 2000 foot; ye charges of the Trees, and Carriage into Place, Cartage of ye Earth and planting ye Trees all charges contained at 7s. p. Tree	122 : 10 : 0

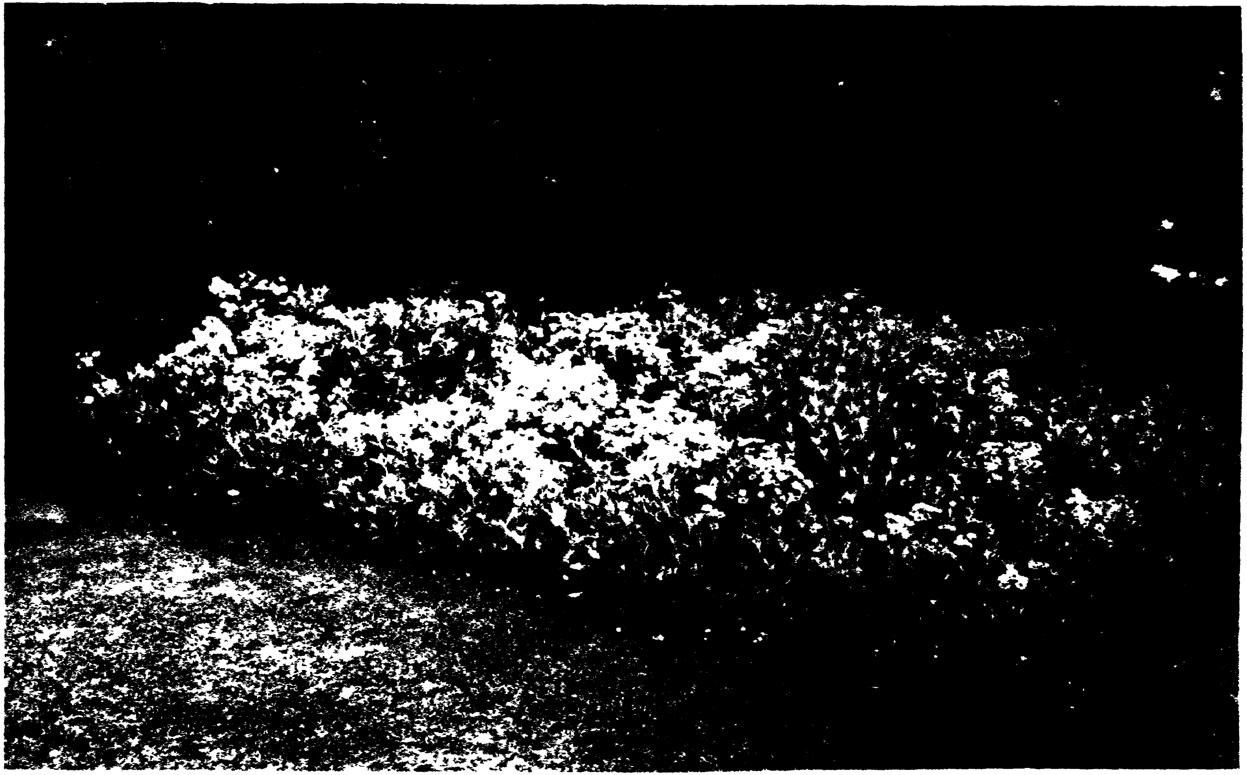

Fig. 107.—Senecio laxifolius at Wisley

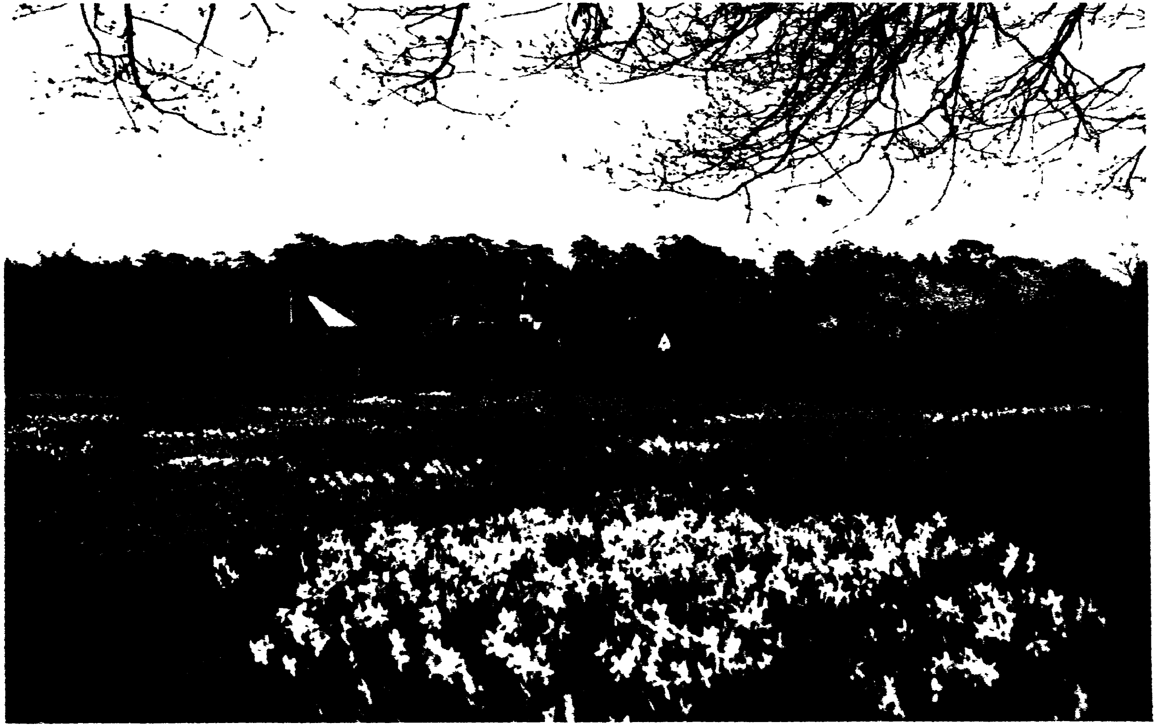

FIG. 108.—DAFFODILS IN THE GRASS AT WISLEY, APRIL 1930

To Pruine ye severall Lyme Trees and others in ye Whole Parke that want it will come to	15 : 0 : 0
Breakeing up and New Gravelling ye severall foot Paths that are now foot Paths, and others yt must be made as that from ye End of ye Mall to ye Passage going into Spring Garden. In all 2359 sollid yards. Ye Charge ; of Breakeing up ye ground before ye new gravell is laid on, to prepair it to receive ye same ; diging and skreening ye gravell, wch. is to be dug in some convenient place in ye Parke. Carting it into Place, being 2500 foot one with another, laying it about 4 inches thick one with another. Spreading & all charges contained at 2s: 6d: per sollid yard is..	294 : 17 : 6
To sow ye severall Places where Paths are made in ye grass (that should not be) with Hay Seed, and covering it with Earth, is supposed may be about 494 Rod. Ye charges of ye Hay Seed covering it with Earth, wch. Earth is to be dug in some convenient Place in ye Parke, and Carted about 2000 foot all Charges contained at 10d. p: Rod is..............	37 : 1 : 0
Cutting and Casting abroad ye Ant & Mole hills in all ye Parke will come to	24 : 0 : 0

The takeing up ye dead Trees and ye bad Chestnuts that damage ye Lyme Trees, ye wood being only fitt for fireing will defray that Charge and the levelling ye Ground.

There are some Large Trees that groweth at ye west end of the Parke next ye Wall, in some Lines that are thought to be of no use. Some of wch: I had Orders in the Late Kings Reign to take up and plant in ye Lines of great Trees in some particular places where it was Requisite to plant Large Trees, and now about 6 or 8 of them will be needfull to be planted, but they being soe large ye Charge of takeing them up, bringing into place and planting them ; will Cost 20s. p. Tree.

These aforesaid workes are what ought to be done, between this and ye Spring of ye Year——There is ye putting ye sides of ye Canall in Order, and some other Workes as Levelling of some Large Hills. Cleanseing of Ponds and ye like which may be done at her Majestyes pleasure, but that of ye Canall wants wharfeing with Planks, but may be done much better, and with less Charge than hath been heretofore.

* * * * * *

Addicons made to her Maty's Gardens & Plantacons since the 1st Augt: 1702 Vizt

Kensington	St. James's House Gardens The New Plantacon Kitchen Gardens Coach Court & piece before the stoves	containing by an Admeasuremt signed by the Officers of the Works Forty Acres & five rods.

To be kept & maintained in the same manner, as those by the Aforegoing Contract, & all things to be found & provided by the sd Henry Wise for Addicons as by the former Agreement he was to find for the Gardens & Plantacons therein menconed.

Henry Wise.

* * * * * *

A Computation of what hath been ye Yearly Charge of keeping the Great Terras to the Castle at Windsor in Order, by Rowling, Sweeping, Weeding, Cleansing etc. Abstracted from the Books of the Office of the Works there.

	£	s	d
Two Men 6 days in a Week each, one time with another at 2s. p. day is	62	8	0
For Broomes	1	6	0
For Shovels	0	9	0
For Wheelbarrows	0	16	0
There is besides this Charge; the keeping the Leads & Division on the East side of the Castle, as also on the North Side, with Hollys, Flowerpots etc. Computed at the Yearly charge of	25	0	0
	89	19	0

May it please yor: L.^{d}p.

The perticulars above being out of Mr. Wise's Contract, the charge has been all along enter'd in ye Books of ye Office of her Ma:^{tys} Works, & comunibus annis has amounted to £89 : 19 : 0 P Ann. which Mr. Wise having taken notice of & proposed to do the whole for £75 P Ann. I think it my duty to lay the same before Yor: L.^{d} p. with my humble opinion that it may be for her Ma.^{tys} service to agree with him accordingly, w:^{ch} if Yor: Lords.^{p} approves the charge may be enter'd monthly in the books of the Office of the works at £6-5s P mensem, & care shall be taken that the business be well performed by him.

All w:^{ch} is humbly Submitted to Yor: Ld.^{p}

Chr. Wren.

Scotland Yard 11th June
1707.

I Have perused Yo:^{r} Mem.^{d} or Representacon within written, and do thereupon Accept of the proposall of Mr. Henry Wise of performing the Service therein Specifyed fro Mids.^{r} last for an

Allowance of Seventy five pounds per Ann. These are therefore to Authorize & require You to insert the said Allowance for him on the books of Your Office in such manner as menconed in your said Mem.^{d} And to take Care that the service be duly performed according to the said proposall for w.^{ch} this shall be a Suff.^{t} Warrant.

Whitehall Treary Chamb.^{rs} 26th June 1707.

Godolphin.

To my very loving freind S^{r} Xt.^{r}
Wren Kt. & the rest of the Prin.^{le}
Offic.^{rs} of her Ma.^{tys} Works for
Windsor Castle.

Mr. Wise to have £75 per Ann. for looking after ye Terras etc. at Windsor.

* * * * * *

A Catalogue of Wall fruit as they are Number'd at Brompton Park, Kensington, Hampton Court, Windsor & Blenheim, in 1708.

1 Brom P:	2 Kensi:	3 Hamp: Ct	4 Windsor	5 Blenhei:		Remarks
					Cherrys.	
		1	4	8	Black heart.	
		2	10	7	Carnation	
		3	5		Red heart	
		4	9	6	Morrocco	
		5			Morello	
		6			Duke	
		7	2	1	May Duke	
		8		3	Lukeward	
			3	2	Orleans	
			6	4	Gascoyne	
				5	Later Duke	
				9	Cherry sent down by my Ld Duke	
			1		Dutch	
			7		Petworths Amber	
					Apricocks.	
		1			English	
		2	3	4	Dutch	
		3		3	Orange	
		4	5	1	Masculine	
		5			White	
		6		6	Breda	
		7			Double	
		8			Great from Venagtenhoven	
		9	1		Turkey	
		10	2	7	Roman	
		11	4	2	Plum	
		12			Smirna	
		13		5	Brussells	
		14			....	
					Peaches & Nectrons.	
		1	6	6	Mountabon	
		2	10	14	Minion	
		3			Fine Minion	

1 Brom Pk:	2 Kensing:	3 Hamp: Co:	4 Windsor	5 Blenheim		Remarks.
					Peaches & Nectrons —cont.	
		4			Brinion musque from France	
		5	2		Brinion round	
		6	4	18	Violet hative	
		7	16	4	Red Magdalen	
		8	12	11	Belchevereuse	
		9	20	1	White Nutmeg	
		10		29	Double Swalch	
		11	19	10	Burdine	
		12	13	12	Admirable	
		13			Melktons p^{ch}	
		14			Little Swalch	
		15		28	Double Montaine	
		16			Great P^{ch} fro Henskirks on an Apricock.	
		17		2	Peach de Troy	
		18		9	Old Newington	
		19			Aromatick	
		20		20	Red Roman N	
		21			Arabian N.	
		22		8	Dutch p^{ch} like ye Mountabon	
		23	3	7	Nobless	
		24		1	Avant	
		25			from St. Albans	good
		26	4	3	Pass Violet	
		27	9		Royall	
		28			Rouge	
		29		27	Persique	
		30		38	Chancellor	
		31		25	Violet Musk	
		32			Wilds	
		33	5	5	White Magdalen	
		34		2	Red Nutmeg	
		35	24	13	Katherine	
		36	14		Italian supposed like ye Admirable.	
		37		30	Purpree	
		38			New Newington	
		39			Belgarde	
		40			Violet târdive	
		41		31	Valute or Alberge rouge	
		42			Nectron from St. Albans	
		43		23	Elrouge Nectron	
		44		18	Violet hâtive N.	
		45		19	Newington N.	
		46		21	Brinion Violet	
		47			Serj^{t}: Stephens N.	
		48		32	Persian	
		49		24	Dutch or Argol N.	
		50			Richards pch.	
		51			Bellis pch.	
		52	8	33	Pavie rouge de Pompone	
		53		17	Anne pch.	
				16	Halls pch.	
				26	Moors pch.	
				22	Brinion white	
				15	White Magdalen musqué	
			18		Narboon	
			23		Blanche Andille	
					Plums.	
		1	3	4	St. Catherine	
		2			Damozeen noir de Tour	

1 Brom. Pk.	2 Kensing.	3 Hamp. Co.	4 Windsor	5 Blenheim	
					Plums—cont.
		3	7	6	Jaune hâtive
		4			White primordian
		5		20	Morrocco
		6		18	Fotheringham
		7		9	Roche Corbon
		8	1	1	La royall
		9	6		Prune d'abricot
		10	4	5	Matre Claude
		11	8	2	Blew } Perdrigon
		12	9	3	White } Perdrigon
		14		17	White Holland
		15		12	Muscle
		16			Peascod
		17		13	Orleans
		18		14	White pear plum
		19		8	Imperatrice
		20			Queen Mother
		21			White Nutmeg
		22			Chips early Amber
		23			Violet
		24		16	Red Imperiall
		25			black Damozeen
		26	5	11	Virginell
		27		10	Reine Claude
		28	2	7	Drab d'Or
		29			Dauphin
		30		15	Pomegranet
		31			Amber
		32			St. Julian
		33			White Prunella
				19	Chesson plum
					Figgs.
		1	1	1	Blew.
		2	2	2	White
		3			Blew from Windsor
		4			Mr. Harveys.
		5			Sr: Henry Capell's blew.
		6		3	Blew from Whitten
				4	White from France
				5	Sr: Jon: Talbots white.
					Vines.
		1			Black } Frontiniack.
		2			Grizly } Frontiniack.
		3		2	White } Frontiniack.
		4		7	White sweet water
		5		14	Muscat of Jerusalem
		6	7	1	Red Frontiniack
		7			Blew Muscadine
		8			Stript' grape from Taplow.
		9	2		White Muscadine
		10	4	4	Currant
		11			Barboyce
		12		10	Red sweet water or Morellian
		13			Burgundy
		14			Greek
		15		12	Claret or Red wine
		16	3	15	Orleans
		17			Lombardy
		18			Fox grape
		19			Verjuice
		20			Currant something resembling ye Hesperian

1 Brom. P.	2 Kensing.	3 Ham: Ct.	4 Windsor	5 Blenhm.	
					Vines—cont.
		21	6		Amber
		22	1	8	Royall Muscadine
			5		Damson
					Pears.
		1	6	10	St. German
		2	3	2	Colmar
		3		6	Cresanne
		4	9	7	La Marquisse
		5			St. Andrew
		6	10	3	La Chasserie
		7			St. Michael
		8	5	1	Virgoulée
		9		12	Cadillac
		10		11	Louise bonne
		11		17	Ambrette
		12		4	St. Marshall
		13		9	Burgamotte de Pâque
		14			Bonchretien
		15			Epine d'hyver
		16			Black pr: of Worcester
		17			Beurré de Quascid
		18			Petit Rousselet
		19	1	5	Winter Bonchretien
		20	11		Spanish Bonchretien
		21			Bezi de Chamontel
		22			Burgamot Swisse
		23			Golden Bell
		24		14	English warden
		25			Roshea
				8	Beurré du Roy
			4		Burgam^{ta} de Bugi
			7		Verte Longue
			8		Amadott

* * * * * *

That another side of horticultural activity was not neglected is shown by the following note :

A Discription of Five of the Eleven New Pears raised in His Majesty's Gardens at Kensington from the kernels of the best that could be collected both in Great Britain and from Abroad, and which bore fruit in the year 1715.

When eatable.	Description.	Names.
Feb$^{y.}$ & March & May some years last in April.	Resembles the St. Germain in shape, size & Colour & at present seems to surpass all the melting pears hitherto known for duration and Goodness.	King George.
Nov$^{r.}$ & Decemb$^{r.}$	Resembles the St. Germain but shaped like the Virgoulée, at the Stalk, the kernels are lesser than the St. Germain, its a very delicious and melting fruit.	George, Prince of Wales.

Nov$^{r.}$ & December$^{r.}$	Resembles the Colmar, but yellower w$^{th.}$ a little Red, & supposed if planted against a wall twil be very beautifull, the Eye is perticular, branching its self into 5 points it is very rich & melting & is likely to prove a very beautifull & good pear.	Princess of Wales.
Oct$^{r.}$ & Novemb$^{r.}$	A Long Shaped Pear, a little like the St. Germain, but is smaller towards the stalk very rich & melting, and seems at present to surpass all the winter pears in his season.	Prince Frederick.
Nov$^{r.}$ & December$^{r.}$	Shaped like the Ambrette of a fine bright Russet, a very rich melting pear & very good.	Princess Ann.

* * * * * *

There are many other memoranda and accounts in this collection extending up to 1727 but enough has been extracted to show something of the position of affairs in the Royal Gardens under Mr. WISE, and of the varieties of fruits then considered worth planting in the best gardens.

F. J. CHITTENDEN.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Asteranthera ovata. A.M. August 1, 1939. From Colonel Stephenson R. Clarke, C.B., Haywards Heath. This very rare and distinct species of Gesneraceae was collected in Chile in 1927 by Mr. H. F. Comber, who describes it in his field note as a "hard-wooded perennial climbing tight on the trunks of deciduous trees in forest" at an altitude of 2,000 feet. The young plant exhibited had made a dense mass of slender stems bearing opposite, ovate, coarsely-toothed leaves about one inch long, shortly stalked and of fleshy texture. The erect, axillary flowers have carmine (H.C.C. 21) corollas two inches long, tubular with ovate, spreading lobes. Probably not generally hardy, but suitable for moist conditions in the cold house or on a sheltered wall.

Begonia 'A. T. Shardlow.' A.M. August 15, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore & Langdon, Bath. A very handsome tuberous-rooted variety with very large rich dark crimson-scarlet double flowers of perfect shape.

Begonia 'Golden Queen.' A.M. August 15, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore & Langdon, Bath. A tuberous-rooted variety with large double lemon-yellow (H.C.C. 4) flowers of good form.

Begonia 'N. F. Barnes.' A.M. August 15, 1939, as an exhibition variety. Raised and shown by Messrs. Blackmore & Langdon, Bath. A very attractive tuberous-rooted variety with large double well-shaped nasturtium-red (H.C.C. 14) flowers.

Carnation 'Harriet Harrow.' A.M. July 25, 1939, as an exhibition variety. Raised and shown by E. Charrington, Esq., Icewood Cottage, Limpsfield. A hardy border variety of good growth, with stiff stems and a strong calyx. Flowers 3 inches across, of good form, sweetly scented, of an old rose shade; margins of petals entire.

Carnation 'Inez Blair.' A.M. July 25, 1939, as an exhibition variety. Raised and shown by R. Thain, Esq., Thatch Lossum, Shalford, Nr. Guildford. A hardy border variety with stiff erect stems and a strong calyx. Flowers 3 inches across, of good form, white ground heavily flaked with a deeper and redder shade of rhodamine-purple (H.C.C. 29).

Carnation 'Julia B. Wells.' A.M. July 25, 1939, as an exhibition variety. Raised and shown by E. Charrington, Esq. A hardy border variety of good habit with stiff erect stems and a strong calyx. Flowers 2¾ inches across, of good form, primrose-yellow ground (H.C.C. 601/2) flaked and edged rose-bengal (H.C.C. 25/2), margins of petals entire.

Carnation 'Tauntonian.' A.M. August 15, 1939. As a market

FIG. 109.—POTENTILLA NITIDA

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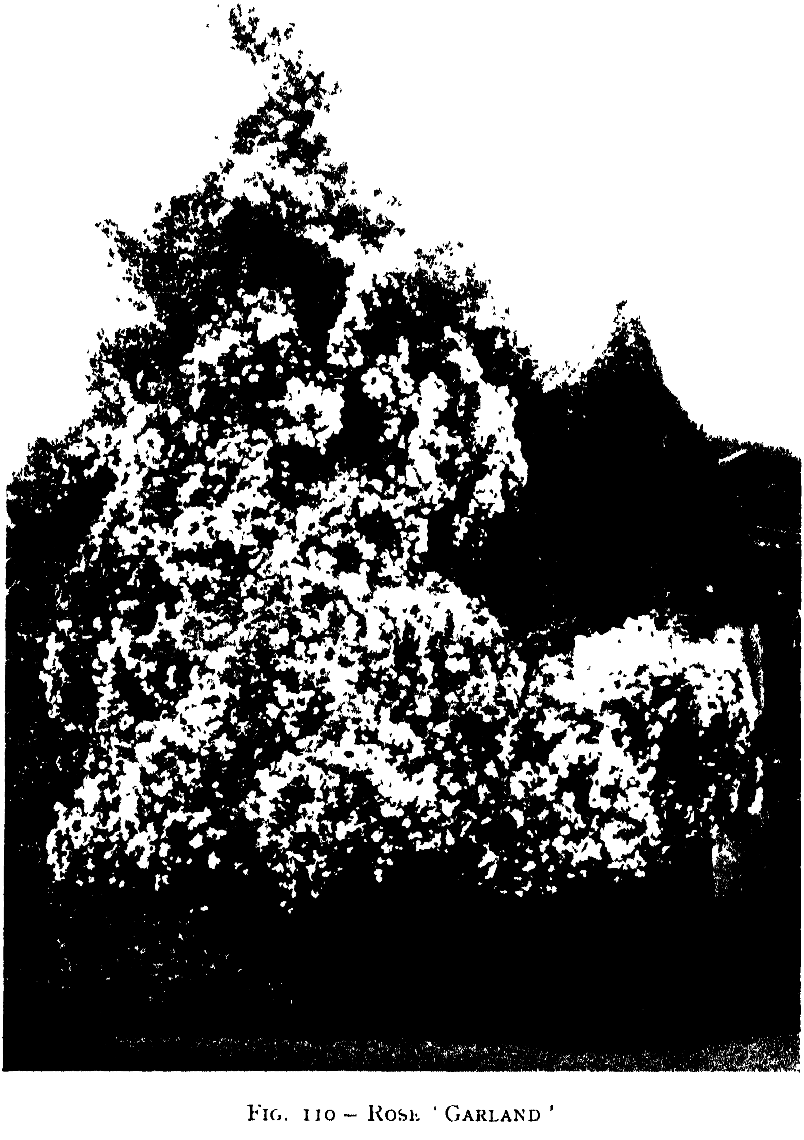

FIG. 110 – ROSE 'GARLAND'

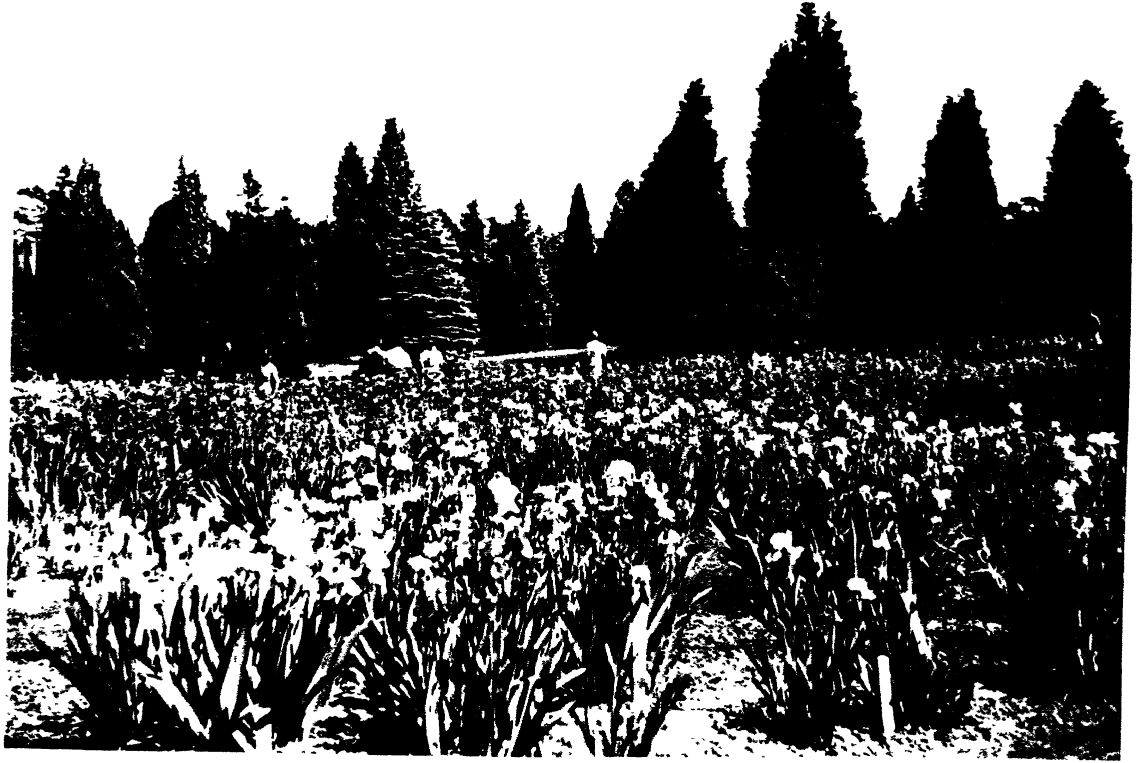

FIG. 111 THE BEARDED IRIS TRIALS AT WISLEY, 1930

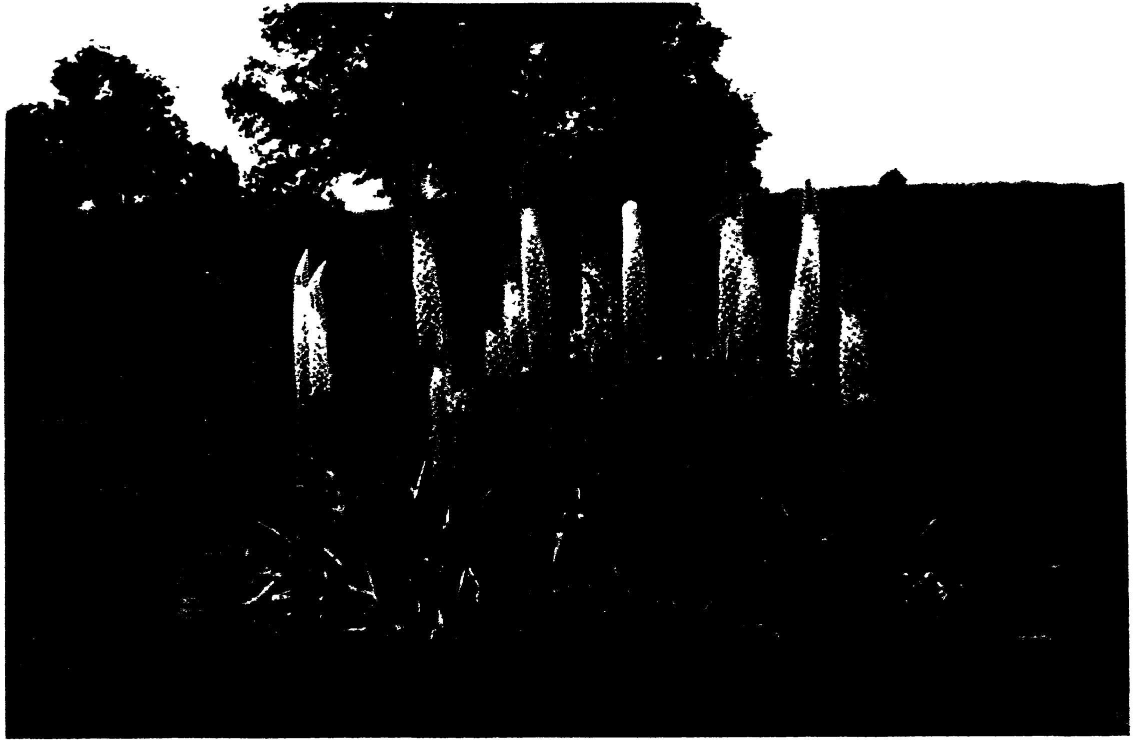

FIG. 112.—EREMURUS ROBUSTUS AT WISLEY, JUNE 1939.

[To face p. 481

variety raised and shown by Messrs. Napiers, Stepswater Nurseries, Taunton. A perpetual flowering variety of vigorous habit, with stiff wiry stems and full-centred flowers, 3 inches diameter of good form; petals wavy, deeply cut at margins, crimson (H.C.C. 22/1), somewhat scented; calyx strong.

Chrysanthemum 'Brimstone.' A.M. September 19, 1939, as an exhibition variety. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbys. An early flowering variety with stiff stems 15–18 inches long and rather large foliage, closely arranged. Flowers 5–5½ inches across, incurved, with broad petals, clear canary-yellow.

Chrysanthemum 'Corona.' A.M. September 19, 1939, as an exhibition variety. Raised and shown by Messrs. Johnson. An early flowering variety with stiff stems 18-24 inches long and medium-sized evenly spaced foliage. Flowers 4½-5 inches across, incurved, of good form, aureolin (H.C.C. 3/1), lightly shaded with marigold orange (H.C.C. 11).

Chrysanthemum 'Marigold.' A.M. September 19, 1939, as an exhibition variety. Raised and shown by Mr. H. Shoesmith, Mayford, Woking. An early flowering variety with stems 15–18 inches long and rather small foliage. Flowers 5–5½ inches across of good form, outer petals reflexing; petals semi-rolled, stiff, aureolin (H.C.C. 3/1), suffused with orange (H.C.C. 12).

***Delphinium paniculatum. A.M.** August 31, 1939. Sent by Messrs. Sutton, Reading. Plant of loose open habit, 2 feet tall, free flowering over a long period, especially during long sunny periods; a hardy annual. Flowers single, ¾ inch diameter, violet (H.C.C. 36).

Dracocephalum Stewartianum. A.M. August 1, 1939. From the Director, Royal Botanic Gardens, Kew. A good plant for the herbaceous border, collected by G. Sherriff in China. The tubular flowers of Aster violet (H.C.C. 38/1) are borne in crowded axillary clusters on stout stems two to three feet high. The leaves are two to four inches long, lanceolate and bluntly toothed.

***Gypsophila paniculata 'Flamingo.' A.M.** August 17, 1939. Sent by Messrs. Baker, Codsall, Wolverhampton. Plant 3½ feet tall, habit of Gypsophila 'Bristol Fairy' but flower $\frac{3}{16}$ inch diameter, semi-double, flushed with carmine-rose (H.C.C. 621/3).

***Heliopsis gigantea. A.M.** August 17, 1939. Raised by Messrs. Lemoine, introduced and sent by Messrs. T. Carlile, Loddon Nurseries, Twyford, Berks. Plant 4½ feet tall, flowering from early August, branched; flowers 4–5 inches across, semi-double, ray florets broad, bright Indian yellow (H.C.C. 6), disc ¾ inch diameter.

***Heliotrope 'Mme. de Bussy, Improved.' A.M.** August 31, 1939. Sent by Mr. A. Falconer, Stamford Park, Stalybridge, Cheshire. Plant vigorous, 2 feet tall, free branching habit, and very free flowering. Inflorescence compact, freely produced, 8–10 inches across, flat-topped; flowers ½ inch diameter, slightly scented, amethyst-violet (H.C.C. 35/2). Foliage dark green, upright habit.

* After trial at Wisley.

***Heliotrope 'Mrs. J. W. Lowther.' H.C.** August 31, 1939. Sent by Messrs. John Forbes, Hawick, Scotland. Plant of compact habit, 12 inches tall, very dark green foliage, with compact freely produced flower heads, 7–9 inches across, flowers closely arranged, each ¼ inch across, heavily scented, Imperial purple (H.C.C. 33/1).

Hydrangea serrata rosalba. A.M. August 15, 1939, from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A freely branched hardy shrub with bright green ovate-oblong toothed leaves. The flowers are borne in flattish panicles of small powder-blue fertile flowers surrounded by larger sterile blossoms varying in colour from almost pure white to deep rose.

Lilium medeoloides. A.M. August 15, 1939, from E. Kenneth Wilson, Esq., Wimbledon. A tall slender plant with one large whorl of oblanceolate leaves about 4 inches long and above it a few scattered leaves, much smaller. The scentless, nodding, strongly reflexed flowers are borne in a terminal raceme of 6 to 12 flowers. The flowers are of a variable orange tone.

***Salvia farinacea 'Royal Blue.' A.M.** September 19, 1939. Raised and sent by Messrs. Hurst, Houndsditch, London. Plant of compact habit, 2½ feet tall, raised from seed, free-flowering with medium green foliage, and flower spikes 20 inches long, of a greyish campanula-violet shade (H.C.C. 37/1); flowers ⅜ inch diameter, campanula-violet (H.C.C. 37), blotched white at throat, calyx woolly grey.

* After trial at Wisley.

GARDEN NOTES.

Potentilla nitida (fig. 109).—It is in the Dolomites and the eastern European Alps, and always at high altitudes, that *P. nitida* covers the rocks and shingly screes with its mats and carpets of silvery grey green leaves and rosy pink flowers. It is one of the most beautiful and striking plants of the limestone rocks and ridges, and, if perchance it should stray into a non-calcareous district, it shows very clearly that it is unhappy and not feeling at home.

In the mountains it is found growing in rocky and stony places where there is little or no soil, and it forms one strong woody root which goes down to a great depth. So in the garden it should never be overfed but should be given a starvation diet and " the stones of adversity." Poor stony soil with a heavy percentage of mortar rubble or limestone chips is a suitable mixture for the plant, and it should always be in full sun.

It is a free and easy grower and quickly forms large mats, but it is frequently accused of being a shy flowerer, or of not carrying enough flowers for the size of the plant ; and it is even said that there is a form which does not flower at all. This is all a perversion of the truth and very unfair to the plant. Except where our erratic climate intervenes the fault is not with the plant ; it is with the grower who fails to provide the plant with what it needs and requires to help and enable it to flower. At the same time he might remember that the form or variety called *elongata* is probably a better and more showy plant than the type.

Sunny dry weather in spring and early summer will certainly help the plant to flower, and if it is starved and given lime it will, as FARRER has told us, "blossom as the rose which it resembles."—*C. T. Musgrave.*

Rose ' Garland.'—We are able to give the illustration (fig. 110) of the Garland Rose through the kindness of LEONARD NOBLE, Esq., in whose garden at Harpsden Court, Henley-on-Thames, it is growing. It was planted there about thirty years ago and covers a large holly over and through which it has grown. The illustration shows with what freedom it flowers every year.

THE AWARD OF GARDEN MERIT.—LI.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

254. PHLOX SUBULATA.

Award of Garden Merit, June 19, 1939.

Phlox subulata is a native of sandy hills and woods from Ontario, Canada, southwards along the Atlantic seaboard to Florida. It reached England in 1786 and soon proved itself at home—a hardy, hearty doer. It makes a densely tufted growth and being evergreen its green mats give pleasure in the garden in winter, a pleasure to be turned into delight in May and June when its flowers open and hide the foliage by their profusion. The leaves are closely set, very narrow and sharply pointed, about ½ inch long, and generally margined with hair. The numerous leafy branches turn up to reach a height of three inches or so and each produces a few flowers in a corymb at its end. The flowers are typically pinkish with a dark centre but there are many colour-forms. The petals, wedge-shaped, and notched, lie flat; in some plants they make a rather starry flower but in others the margins of the petals touch. The variations have led to the bestowal of a number of names, some of which, given long since, still persist. For instance a perfectly smooth leaved plant was figured in the Botanical Magazine t. 415 under the name of *Phlox setacea* which is nothing more than *P. subulata* figured in the same Journal t. 411. The *P. setacea* of some present-day catalogues is nearly always *P. subulata*, *P. subulata* being the prior name. *P. nivalis* also belongs here and should be called *P. subulata nivalis*—a lovely thing with white flowers, sometimes listed as *P. Nelsoni*, and figured in Loddiges' Botanical Cabinet t. 730, as *P. nivalis*. There is a plant inferior to this, a distinct species, which properly bears the name *P. Nelsoni*, from S.E. Arizona, erect and nearly a foot high. Another white form is also figured in Loddiges' Botanical Cabinet t. 1731, as *P. aristata*. Another Phlox with rosy-lilac flowers, sometimes called *P. frondosa*, very vigorous and free-flowering, is also best regarded as a variety of *P. subulata*, since its general characters so closely agree. Besides these wild varieties many others have been raised in gardens and of these the catalogues can speak. Several have received awards, e.g. the beautiful 'Vivid,' which received a First Class Certificate in 1884; and 'Lavinia,' 'Seraph' and 'Sprite,' all have had the Award of Merit. There are several other varieties described in the JOURNAL R.H.S. **56**, p. 256. Not all of these garden varieties can be grown with such ease and certainty of continuance as the wild types, but they are worthy of the little extra care. A moist well-drained soil in sun suits them best, and a fairly elevated spot on the rock-garden, for the greatest risk of loss occurs in mild moist winters. Cuttings taken in July and rooted in a shaded cold frame form the readiest means of increase, or large plants may have some light soil sifted over them in summer, and after the trailing branches have rooted as a result, may be pulled to pieces, and so increased.

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* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title Some Good Garden Plants. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. **63**, pp. 190, 246, 448 and 546; **64**, pp. 134, 232, 290 and 374.

BOOK REVIEWS.

"Flowering Shrubs for Small Gardens." By S. Duruz. 8vo. xiv + 162 pp. Ill. (Drummond, London, 1939.) 5*s.*

Shrubs for flowers were little used in gardens a quarter of a century ago. Now, praise be, they have been discovered, and no one need be ignorant of their value, of the comparative smallness of cost of maintaining them in the garden, or of the kinds to plant, for there are many books, some large, some medium, some small, which will guide the would-be grower in the making of a shrub-garden—a garden indeed where, even in a small space, flowers may be found the year round.

Here is another of them with a good selection out of the many—too many of course to include in one small garden, but selected so that the pleasure of almost all would be satisfied.

Many of the shrubs are illustrated by good photographs. The type is clear and easy to read and the book reasonable in price.

"Protein Metabolism in the Plant." By A. C. Chibnall. 8vo. xiii + 306 pp. Ill. (Oxford Univ. Press, 1939.) 18*s.*

The chemistry of the complex nitrogenous bodies which are an essential part of all living creatures has been a subject of intense study for a long period, and the author has brought together an account of the earlier investigations on the formation of these substances in seedlings and added to it a great body of work which has been done since these investigations first began in the first half of the nineteenth century.

The whole matter is too involved and too specialized for review in this JOURNAL, but we are glad to be able to draw the attention of students to this masterly account of the present state of knowledge concerning this important subject.

"Gardening in East Africa: a Practical Handbook." Ed. by A. J. Jex-Blake. Ed. 2. 8vo. xiv + 388 pp. Ill. (Longmans, Green, London, 1939.) 12*s.* 6*d.*

We commended this book when it was published in 1934 and now a second edition has appeared, half as large again as the first; it gives us great pleasure to draw attention to its value. It has been prepared by members of the Kenya Horticultural Society and of the Kenya, Uganda and Tanganyika Civil Services, and therefore gives first-hand experience of gardeners in the districts it is intended to serve. Fifty-five native plants are illustrated in colour on ten plates and these are very well reproduced.

There are short chapters on garden planning and on elementary horticulture as well as chapters on the climate, soil, manuring and cultivation, while the bulk of the book is naturally concerned with the plants that will or will not grow under the various conditions found in East Africa. Insect pests and plant diseases, while they do not loom large, are adequately dealt with in two chapters at the end of the book.

"Aristocrats of the Garden." By E. H. Wilson. 8vo. xxiv + 308 pp. Williams & Norgate, 1938.) 15*s.*

This is a reprint made in England of one of the late Dr. Wilson's popular books, first published some time ago in America.

"The Structure and Development of the Fungi." By H. C. I. Gwynne-Vaughan and B. Barnes. Ed. 2. 8vo. xvi + 449 pp. Ill. (Cambridge University Press, 1937.) 18*s.*

The first edition of this book appeared in 1926, and this new edition incorporates the results of research in several different groups of fungi. An indispensable book for the student, well illustrated and well produced.

"Cacti for the Amateur." By Scott E. Haselton. 8vo. Ill. (Abbey Garden Press, Pasadena, 1938.)

A book intended to encourage novices should be written in simple terms by one who knows the subject thoroughly but is not so remotely set upon the heights that he cannot still appreciate the difficulties of those just setting out on the trail; moreover, there should be plenty of illustrations. Cacti for the Amateur fulfils all these requirements. The author has been Editor of the Cactus Journal of America for a number of years and so has at his command just the sort of information that the beginner requires and has presented it here in a thoroughly scientific manner, so that the reader will have nothing to unlearn when his studies become more advanced. The formation of a collection, cultivation in all its details, indoors and out, are fully dealt with, and there is also a chapter on classification, and some sound advice on plant names.

A very wide range of excellent illustrations greatly adds to the value of the book; these show many types of cactus, either in their natural surroundings or under cultivation; there is a two-page frontispiece in which the 110 coloured illustrations previously used in Cactus by Van Laren (English edition by Scott E. Haselton) are reproduced in miniature and give a very good idea of the types of plant which the family Cactaceae includes.

The book is primarily intended for American readers, but is equally suitable for those in other countries, and the fact that it is written in the English rather than in a too full-flavoured American idiom, will make it acceptable in other English-speaking countries. The value of the book cannot be assessed from the unusually low price, due to the co-operation of five of the dealers in America.

V. HIGGINS.

" Manual of Pteridology." Ed. by Fr. Verdoorn, with a foreword by Professor F. O. Bower, F.R.S. 8vo. 640 pp. Ill. (Nijhoff, The Hague, 1938.)

In the introduction to this manual one reads that " This book is primarily but by no means exclusively designed for the taxonomist who is anxious to improve his methods and broaden his outlook. At the same time it offers to the general botanist the necessary fundamental facts about the group and a survey of the chief results of lines of investigation related to his own." . . . " The manual is not and never could be an exhaustive monograph, it is rather a collection of essays."

The editor follows the same method of approach as in his previous Manual of Bryology, and has been fortunate in enlisting the services of twenty distinguished researchers into problems concerned with the ferns.

For those whose interest lies in structural details there are essays on morphology and anatomy by Schoute and Williams, and cytological studies are reviewed by Atkinson and Döpp.

The chapters dealing with the species in their relationship to their natural environment may prove of most interest to horticulturists. In this section the ecology of tropical ferns is discussed by Holttum, and the ferns from cooler regions by Gams. As many gardeners are well acquainted with ferns from shady and moist habitats it will be of interest to them to read of the sun ferns of the tropical lowlands and those of the mountain thickets, and other less favourable habitats. The geographical destribution of genera and species forms the subject of another essay by H. Winkler,

In cultivation the divergences from normal shown by the fronds of the commoner species frequently attract the attention of the enthusiast and many of them have been described and named. It is not perhaps so generally realized that these differences are very frequently caused by the segregation of the genetic factors influencing the development of the fronds. Such factors are more widely recognized in the flowering plants where the details of the reproductive processes are better known to many growers. The essay by Andersson-Kottö deals with genetical work carried out with ferns.

Physiological and biochemical aspects form the subject of further essays, and the relationship between ferns and fungi is considered in Burgeff's essays on mycorhiza. Lycopods, Psilotums, and Selaginellas are not excluded, but there is here only a brief consideration of fossil ferns.

This manual will form a very useful companion volume to the large work of Professor F. O. Bower. He has written the foreword in it, in which he briefly outlines the theories concerned with the origin of land plants and he discusses the pivot place occupied by the ferns and their allies in morphological comparisons. For information not dealt with in Professor Bower's books this manual will be often consulted.

The essays are adequately illustrated, each concludes with a useful bibliography, and there are also general indexes of plant names and authors. Half the essays are in German, the others in English.

NOTES AND ABSTRACTS.

National flowers. By R. J. Hayden (*Arnold Arb. Bull. Popular Inform.*, ser. 4, vol. vi, pp. 1–5 ; 1938).—Although certain flowers have come to be associated with certain peoples and regarded as national emblems, in Europe none have as yet been officially accepted by national governments. The author therefore takes general opinion, associating the Rose with England, the Cornflower with Germany, the Marguerite (*Chrysanthemum frutescens*) with Italy, Heather (*Calluna vulgaris*) with Norway, *Linnaea borealis* and the Ox-eye Daisy (*Chrysanthemum Leucanthemum*) with Sweden, Clover (*Trifolium*) and Beech (*Fagus*) with Denmark, common Rue (*Ruta graveolens*) with Lithuania, the Tulip with the Netherlands, Shamrock (*Trifolium repens* or *minus*) with Ireland, the Thistle with Scotland, the Leek with Wales, Edelweiss (*Leontopodium alpinum*) with Switzerland, the Violet with Greece, the Sunflower (*Helianthus*) with Russia and Golden-rod (*Solidago*) with U.S.A. The official state flowers of U.S.A. are as follows: Alabama (Golden-rod, *Solidago sp.*), Arizona (Giant Cactus, *Cereus giganteus*), Arkansas (Apple blossom, *Malus* sp.), California (Californian Poppy, *Eschscholzia californica*), Colorado (Colorado Columbine, *Aquilegia caerulea*), Connecticut (Mountain Laurel, *Kalmia latifolia*), Delaware (Peach blossom, *Prunus Persica*), Florida (Orange blossom, *Citrus sinensis*), Georgia (Cherokee Rose, *Rosa laevigata*), Idaho (Lewis' Mock-orange, *Philadelphus Lewisi*), Illinois (Wood Violet, *Viola sp.*), Indiana (*Zinnia* sp.), Iowa (Wild Rose, *Rosa pratincola*), Kansas (Sunflower, *Helianthus annuus*), Kentucky (Golden-rod, *Solidago* sp.), Louisiana (Southern Magnolia, *Magnolia grandiflora*), Maine (Pine, *Pinus Strobus*), Maryland (Black-eyed Susan, *Rudbeckia hirta*), Massachussetts (Trailing Arbutus, *Epigaea repens*), Michigan (Apple blossom, *Malus* sp.), Minnesota (Showy Lady-slipper, *Cypripedium Reginae*), Mississippi (Southern Magnolia, *Magnolia grandiflora*), Missouri (Downy Hawthorn, *Crataegus mollis*), Montana (Bitter-root, *Lewisia rediviva*), Nebraska (November Golden-rod, *Solidago serotina*), Nevada (Sage-bush, *Artemisia tridentata*), New Hampshire (Purple Lilac, *Syringa vulgaris*), New Jersey (Violet, *Viola* sp.), New Mexico (*Yucca* sp.), New York (Rose), North Carolina (Ox-eye Daisy, *Chrysanthemum Leucanthemum*), North Dakota (Prairie Rose, *Rosa arkansansa*), Ohio (Scarlet Carnation), Oklahoma (Mistletoe, *Phoradendron flavescens*), Oregon (Oregon Holly-grape, *Mahonia Aquifolium*), Pennsylvania (Mountain-laurel, *Kalmia latifolia*), Rhode Island (Violet, *Viola* sp.), South Carolina (Carolina Jessamine, *Gelsemium sempervirens*), South Dakota (American Pasque-flower, *Pulsatilla hirsutissima*), Tennessee (*Iris* sp.), Texas (Texas Bluebonnet, *Lupinus subcarnosus*), Utah (Sego-lily, *Calochortus Nuttallii*), Vermont (Red Clover, *Trifolium pratense*), Virginia (Flowering Dogwood, *Cornus florida*), Washington (Coast Rhododendron, *Rhododendron macrophyllum*), West Virginia (Great Rhododendron, *Rhododendron maximum*), Wisconsin (Violet, *Viola* sp.), Wyoming (Indian Paint-brush, *Castilleja coccinea*), Hawaii (*Hibiscus Rosa-sinensis*), Alaska (Forget-me-not, *Myosotis* sp.).—*W. T. S.*

Ptychogyne flexuosa (Rolfe) Pfitzer. By V. S. Summerhayes (*Bot. Mag.* t. 9563 ; July 1939).—A native of Java, Bali, and possibly Sumatra suitable for the warm orchid house, bearing a raceme about 6 inches long of many white flowers borne at the angles of the zigzag rhachis, and long lanceolate leaves.

The genus Ptychogyne is here kept distinct from Coelogyne.—*M. S.*

Rhododendron ravum Balf. f. et W. W. Sm. By J. Hutchinson (*Bot. Mag.* t. 9561 ; July 1939).—A hardy species of the Lapponicum series native in Yunnan, reaching 13 feet in height and bearing loose trusses of about ten deep rose flowers.

This plant is very like *Rhododendron cuneatum*, but differs in its pubescent style.—*M. S.*

Schima argentea Pritzel. By H. K. Airy Shaw (*Bot. Mag.* t. 9558 ; July 1939).—An evergreen shrub or large tree, sometimes attaining 65 feet in height, bearing axillary white flowers. Native in Assam, S.W. China, N. Siam, and Formosa. (See the JOURNAL, R.H.S., 59, p. 409).—*M. S.*

Vitis Piasezkii Maxim. By F. Ballard (*Bot. Mag.* t. 9565 ; July 1939).—A vine from Northern and Central China with polymorphic leaves, some simple, others three- to five-lobed, and rich purple-black glaucous berries.—*M. S.*

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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TO FELLOWS AND ASSOCIATES.

MANY owners of gardens will be able to increase their vegetable crops, and will thus contribute greatly to our home food resources. Fruit, so necessary for health, must not be neglected and should be cultivated as usual. The Council is anxious, too, that these increased demands upon our gardens should not entirely displace the ornamental aspect. The mental refreshment and cheer which flowers give us is of great importance in troubled days, the sane mind is needed as well as the healthy body.

AUTUMN SHOW.

The final Show of the year was held at the end of October, too late to permit a report here. The good support given by trade exhibitors and others was an encouragement to the Society to carry on its work, so far as possible, in all branches of horticulture.

PANEL OF LECTURERS IN THE PROVINCES.

Good progress has been made in the formation of the panel of gardeners willing to give instructive lectures, and it will be possible now to deal with applications for their services in most parts of the country. It will be advisable, if possible, to choose the daylight hours for the convenience of the audience, as well as the lecturers.

ADVISORY COMMITTEES.

Horticultural committees are gradually being set up and it is hoped that, shortly, further information and a list of such committees will be obtainable.

LINDLEY LIBRARY.

The Lindley Library services are being maintained with some difficulty owing to the duties of the assistant librarian on certain war services and the fact that many rare books are now in a safe country library, but books may be obtained through the post. Extra copies of modern books dealing with Vegetables and Fruit have been obtained in order to satisfy the demand for them. The library at Vincent Square will be open and books may be consulted there. The library will be closed at 5 o'clock or at half an hour before sunset, whichever is the earlier.

WISLEY.

All requests for advice should be addressed to the Director, R.H.S. Gardens, Wisley. The Gardens themselves have attracted many visitors during October. It has been decided to continue certain trials of vegetables and flowers, and the standard collections of Dahlias, Delphiniums, Early-flowering Chrysanthemums, Border Carnations, etc., are being maintained so that the work of past years shall not be lost.

DEMONSTRATIONS.

On December 6 and 7 (2 to 4 P.M.), weather permitting, there will be a demonstration at Wisley on the Pruning of Fruit Trees. The Director of the Gardens will be glad to hear from those desiring to attend this demonstration at an early date.

Copies of the article in this JOURNAL on "Simplified Pruning" can be obtained from the Office at Vincent Square.

PUBLICATIONS.

The Lily Year Book will be available this month at 5*s*. in paper cover, and 6*s*. in cloth binding. The R.H.S. Diary is now available and it will be found that the dates of shows are given in the Calendar. Unfortunately, this portion of the Diary had been printed before the outbreak of hostilities and the publishers could not replace this, save at considerable expense. Users of the Diary are therefore requested to cancel these events. An order form for the Diary is circulated with this number of the JOURNAL.

The simple leaflet on "Vegetable Production in Private Gardens and Allotments" (Growmore Leaflet No. 1, free), circulated with the October Journal, has been much appreciated. Fuller details of vegetable growing will be found in "Food from the Garden" (Growmore Bulletin No. 1, 3*d*.). These can be obtained either from the Society or through H.M. Stationery Office, or any bookseller.

EXAMINATIONS.

These will be continued and it is satisfactory to report that many enquiries are being received about them.

CHANGES OF ADDRESS.

Owing to the present conditions there have been recently many changes of address notified by Fellows, both private and also Bank addresses. It would greatly facilitate the office administration if all such changes can be notified before the close of the year.

The Society's work in these urgent days will be of great importance, not only to its Fellows and Associates but to the whole country.

The maintenance of its advisory work and its panel of lecturers throughout the country will help all those who are extending the growth of Vegetables and Fruit. At Wisley the maintenance of the collections of flowering and other plants will preserve for horticulture the high standards of to-day. The Council therefore appeals with confidence to its Fellows and Associates to continue their membership, and thus take their part in maintaining our national life.

WISLEY IN NOVEMBER.

As we run into the shorter days of November there are but few plants actually in flower to be recorded, although Wisley is still worthy of a visit for the sake of the autumn tints of foliage and colour of the berries.

Most of such plants will be found amongst the shrubs in the Wild Garden, in Seven Acres, and in the Azalea and Award of Merit gardens. Examples having brightly coloured leaves at the end of their season are the Vacciniums, Enkianthus, *Liquidambar styraciflua* (a tree forty or more feet high), *Acer nikoense*, and other maples, Euonymus, *Lyonia* (*Pieris*) *mariana*, many of the Berberis species and hybrids, *Hypericum patulum Forrestii*, *Rhus Cotinus atropurpureus*, and the brilliant scarlet Oak at the eastern end of Seven Acres, *Quercus coccinea splendens*.

Beneath the Vacciniums in the Wild Garden and in the Azalea garden is a sheet of *Gentiana sino-ornata*, perhaps the most effective in colour of all this large family as well as one of the most easily grown.

Of shrubs grown principally for the beauty of their berries we may mention the Barberries, Cotoneasters, especially *Cotoneaster serotina* and *C. rotundifolia*, *Euonymus yedoensis*, the orange-fruited Sea-Buckthorn *Hippophae rhamnoides*, and the many species of *Rosa* growing in Howard's Field; whilst remaining in bloom, if the weather is propitious, are the evergreen *Osmanthus Aquifolium* and *Schima argentea*, the latter a close relative of the Camellias and Gordonias rather unexpectedly hardy at Wisley. *Viburnum fragrans* usually begins its flowering season at this time, as does that form of the Japanese *Prunus subhirtella* known as *autumnalis* which flowers in November and again in March. The spikes of *Erica vagans rubra* are still making a brave show in the Heath Garden, where the dead heads of the other Cornish Heaths form a delightful carpet of russet brown.

In the beds beside the Alpine House are a number of the autumn-flowering Crocus species, including *C. laevigatus*, *C. longiflorus*, and the pure white *C. niveus*, whilst in the house itself *Aster Pappei* continues the production of its blue Daisy flowers, accompanied by *Iberis semperflorens* and richly-coloured *Cyclamen ibericum* from Asiatic Turkey.

The rock garden still has a contribution to make to the quota of flowers in the Gardens. *Gentiana Farreri* and *G. sino-ornata, Polygonum affine, Schizostylis coccinea*, the red Kaffir Lily from the Cape, with *Saxifraga Fortunei* and perhaps the earliest flowers of *Primula Winteri* are there to swell the total and brighten the short days.

Among the plants now flowering in the glasshouses are the blue *Streptocarpus* 'Merton Giant,' *Alberta magna, Epacris ardentissima* with long stems clothed with rich red tubular flowers, and the pink *Lapageria rosea*, which also succeeds well at Wisley trained on a wall facing north. Here also is the royal purple *Tibouchina semidecandra*. In the half-hardy house *Nerine flexuosa* and many of the salmon-pink or scarlet-flowered hybrids are in bloom, together with the blue *Lithospermum rosmarinifolium* from Capri, the tall yellow *Calceolaria Pavonii* and the bell-shaped white flowers of *Clematis cirrhosa* which continue for some weeks during the winter months.

THE GARDEN IN WAR-TIME.

The national demands entail the deflection of much labour from its normal course, and even inexperienced and unskilled labour will be difficult to obtain and insufficient to meet the demand. Gardens must inevitably suffer, not only from lack of labour, but also from the need to reduce expenditure upon what may be called garden luxuries.

At the same time the importance of obtaining supplies of food from gardens is intensified. By the evacuation of people from large centres a great increase of population has taken place in districts not usually making great demands upon the principal markets ; transport facilities are restricted ; such things as carrots, onions and dried beans, for which we depend in normal times upon countries overseas, may be difficult or impossible to import ; there is likely to be an increase in the demand for fruit and vegetables to offset a possible decrease in supplies of other foods ; there is a growing appreciation of the importance of fresh fruit and vegetables in the maintenance of health : without sufficient supplies the national health must inevitably suffer. These considerations combine to render necessary not only the production of fruit and vegetables for home consumption at its customary high level, but a largely-increased production of both at places readily accessible to the consumers—that is in their own gardens.

The establishment of the garden and the plants in it represent the investment of capital which, so long as it is cared for, returns interest in the form of refreshment to the spirit of man, and to vast numbers the purest of human pleasures: refreshment and pleasure more necessary in times of stress than at any other. Flowers in and about the house have come to be part and parcel of the life of millions and are not to be regarded as luxuries, and although the necessities of the times prevent full attention to them, they cannot be neglected.

To neglect and leave uncultivated the gardens of England would mean, therefore, to destroy capital, deprive a large section of the community of simple wholesome enjoyment, and reduce, to the detriment of the national health, the supply of some of the most important, and indeed essential, articles of food.

It is clearly the duty of all owners and cultivators of gardens, whilst exercising every economy, to maintain their gardens as efficiently as circumstances will allow.

This article * has been written with the object of suggesting methods of economizing the work of the garden so that, whilst the capital invested shall not be wholly lost, or unnecessarily depreciated, the land may be cultivated in such a way as to fulfil its purposes of growing

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* Based upon a pamphlet entitled Economy in the Garden, published by the Royal Horticultural Society during the last war, and modified in the light of experience gained then.

plants pleasant to the eye and good for food, and to secure the maximum of food crops with the minimum of expenditure and labour.

The suggestions towards attaining these objects which follow have been drawn up in the form of brief and direct "instructions," and notes have been added whenever it seemed necessary or desirable to explain why a given "instruction" is recommended.

SUGGESTIONS FOR ECONOMY IN THE GARDEN.

I. GENERAL.

1. Be methodical in the work of the garden. Make a calendar of garden operations to suit your own garden.

> *Note.*—The special pamphlet entitled Food from the Garden, prepared by the Ministry of Agriculture for the present emergency, the R.H.S. Gardeners' Diary, and various pamphlets published by the Royal Horticultural Society, given in the list at the end, will assist in guiding gardeners in drawing up a calendar of operations.

While the calendar must be generally followed, it is most important that work outdoors should be done when the soil and weather conditions are suitable: a good tilth is more important than a given date in spring.

2. Concentrate the work. It is economical to concentrate labour upon work which is pressing at any given time. Thus, in early spring, when the ground is fit for seed sowing, immediately get all hands to work to prepare the ground, draw the drills, sow and level off. When showers fall after a spell of dry weather, concentrate labour upon planting out. When a dry day comes after rains, concentrate upon hoeing and upon mowing such grass as must be mown.

3. No work should be done under cover if there is work outside: leave all inside work for wet days.

4. Do as much of the ground work as possible in open weather in autumn and winter in order to save time in spring. Work on ground in very wet condition is most unwise, on hard frozen ground impossible. A light cover of litter, put on the surface before frost and to be dug in, often makes digging possible even in frosty weather.

5. Omit trenching on well-cultivated ground for a year: rely on digging to the full depth of the spade.

6. See that all tools and appliances are of the best types, properly kept, and cleaned thoroughly after use. Wheel-mounted appliances should be used in large gardens in sizes suitable for manual or other use for carrying, hoeing, raking, earthing up, seed sowing, etc. A small hand-pump sprayer will do more and better work in a much shorter time than a hand syringe.

7. See that all cutting tools, knives of mowers, pruning knives and secateurs are kept with a good cutting edge, and are greased before being stored. Work done with sharp tools is done in less time, with

less exertion, with more effect, and with less danger of damage to pruned trees.

8. Make out lists of seeds needed in good time and order them early in January. Stocks of seed may be short in some instances, and sold out quickly.

9. Buy from firms of good repute. Poor seed at a low price is more expensive than good seed at a fair price. Though under the Seeds Act the standard of germination of many seeds and the year of packeting must be declared, the value of seeds depends also upon trueness to variety and quality and regularity of strain.

10. Make use of all garden and organic household refuse as manure. Where farmyard or stable manure can be obtained it should of course be used, and so also should seaweed, which is equally valuable, but usually a substitute has to be found, and chemical manures alone cannot provide an efficient substitute.

Green manuring is one way to provide a substitute, the use of rotted garden refuse another.

It is, of course, better not to let the seeds of weeds ripen before they reach the rubbish heap, and very hard vegetable matter takes long to decay, but even these in time rot if properly treated, and become valuable additions to the soil. All vegetable refuse can be used, weeds, even couch grass, the parts of vegetables removed before cooking, grass clippings, leaves, hedge prunings, and everything else except diseased plants. No diseased spinach or onion or potato or cabbage root with club upon it should find its way there; they should be burnt, but none of the rest should be wasted in that fashion.

The best way to treat this vegetable refuse is to make a layer of it nine inches deep on the earth in a corner; sprinkle it very lightly indeed with sulphate of ammonia; put on another nine inches of refuse, sprinkle again with sulphate of ammonia, and so on.

Almost all decay is brought about by bacteria and the particular kind that causes straw and similar things to decay requires available food to start it, and this the sulphate of ammonia supplies.

Very little indeed is needed, for as decay goes on the requirements of the bacteria are formed in the heap. The bacteria merely need a start, when they unlock their own food. In six months or so the heap will be of the consistency of decayed farmyard manure, and as valuable. If the heap becomes very dry it will need turning over once or twice, or perhaps watering, but otherwise it can be left to itself.

The heat generated in the heap will kill weeds and most insects. With the exception of the material mentioned above, nothing should be burnt. Burning wastes much of the most valuable part of the plants' constituents and, though the ashes can be used to replace some of the potash removed by the plants, they add no more potash than will the decayed garden refuse. The importance of this compost heap cannot be exaggerated.

If pigs are kept all garden refuse may be put under them. The trodden litter with the dung makes large supplies of valuable manure.

Poultry manure should be stored dry until required for use and is about eight times as rich in plant foods as is stable manure, but it has not the same beneficial mechanical effect on the soil as stable or farmyard manure or decayed garden refuse.

The ashes of diseased plants, and of the larger woody prunings, if burnt, should be spread before they are exposed to rain, or stored in a dry place.

11. Keep down rabbits, rats, mice, moles, grey squirrels, etc.

II. FLOWER GARDEN AND PLEASURE GROUNDS.

1. Do no bedding out. Let annuals, sown where they are to flower, take the place of bedding-out plants. Clarkia, Larkspur, Coreopsis, dwarf Convolvulus, Godetia, Mignonette, Eschscholzia, Shirley Poppy, Tropaeolum, Marigold, Nigella, and many others can be used.

2. Wallflower, Polyanthus, Myosotis, Sweet William, and Canterbury Bell can be easily raised from seed, and Aubrietias, Primroses and Arabis readily propagated for spring flowering.

3. Hyacinths and Tulips ought to be lifted and dried off for autumn planting, but Crocuses, Narcissi and Muscaris can be left for three years or so and annuals sown over them.

4. Beds not used in this way should be turfed or sown with grass seed, or planted with small evergreens. They will then require a minimum of attention.

5. Bulbs grown in pots should be ripened off gradually and used for planting in the garden next year.

6. Sow all seeds thinly. Thin sowing not only economizes seed and reduces its cost, as well as making supplies go further, but lessens the labour of thinning and the injury to seedlings that results during the process. Seedlings left unthinned or not thinned early enough make poor plants.

7. Reduce labour on mowing lawns and verges: only the grass near the house and on lawns needed for games need be mowed frequently. Where possible grass areas should be fenced with hurdles and sheep allowed to graze the grass down: or tethered animals may be allowed to graze.

8. Omit the rolling of lawns.

9. Defer renovation of gravel paths. Use no new material for this purpose. If the paths are very bad, fork up, level and roll.

10. Hedges should be clipped once annually, from mid-July to mid-August, instead of two or three times.

11. All lawn mowings, leaves and prunings and remains of plants should be added to the compost heap (see p. 495).

12. Do no watering except for newly-planted plants.

13. Use the Dutch hoe continually and systematically. This will not only keep down weeds but will ensure that water is not lost by evaporation from the soil.

14. Use stakes as little as possible. Peg down growths instead of staking wherever possible, e.g. with Dahlias and strong-growing bush roses. Where staking must be done it should be done early, and twiggy stakes, such as pea-sticks, are more useful than single sticks to which the plants need to be tied.

15. Prune only those ornamental shrubs which would be spoiled if unpruned, or which would seriously exceed their bounds.

16. Thin out the old shoots of climbing roses once only in autumn or winter.

17. Less attention should be given to the removal of old flowers. The seed pods of Azaleas, Rhododendrons, Laburnums, etc., should remain unpicked. The flowering in the following year may be reduced but much labour will be saved.

18. Postpone the renovation of herbaceous borders. The growths of Asters (Michaelmas Daisies), Heleniums, Solidagos, Achillea Ptarmica, Phloxes, and many other perennials may be thinned by pulling out superfluous growths, thus avoiding the removal, division and replanting that is usual.

III. Vegetable Garden.

1. Sow varieties which give a large yield and are hardy and dependable.

2. Sow thinly and thin early.

> *Note.*—Peas are an exception and do better when sown in the usual manner—say two inches apart (not closer).

3. Ensure a good tilth before seed sowing, and choose suitable weather for the work. This goes far towards ensuring a satisfactory crop and avoids the labour and expense of a second sowing.

4. After drawing drills for such seed as Turnip, Beet, Carrot, Lettuce, Parsnip, do not sow the seed continuously along the drill but at intervals. Drop two or three seeds at each of the stations the plants are finally to occupy. The seedlings being uncrowded will grow better, labour is saved in thinning and seed is economized.

5. Choose dwarf peas rather than tall to avoid the need for sticks.

6. Where means of support are not easily obtained, thin runner beans to 18 inches apart and nip out the tops when they begin to run to induce bushiness. Staking is thereby avoided.

7. Except in light dry soils Celery may be grown on the flat instead of in trenches, blanching by the use of brown paper around the stalks.

8. Leeks should also be grown on the flat. When planting make holes 6–8 inches deep with a dibber, drop a plant into each and push a small amount of earth into the hole. Hoeing will subsequently fill it.

9. Lettuces should, and Cabbages and other Brassicas may, be sown where the plants are to grow instead of on seed beds. If the method described in Instruction III, 4. above is followed no waste of seed will occur and the labour of transplanting is avoided.

10. Protect seed and seedlings from birds, mice, slugs, caterpillars and flea beetles.

> *Note.*—Peas and broad beans may be protected from mice by dusting with red lead or damping with paraffin before sowing. Peas, Brassicas and Lettuces may be protected from birds by wire "pea-guards," or by stretching black cotton along the rows. Caterpillars and flea beetles may be destroyed by dusting seedlings with Derris powder; slugs may be destroyed by the use of Meta and bran bait. This consists of a bran bait to which has been added Meta Solid Fuel (obtainable from ironmongers, etc.)—1 tablet of Meta crushed to a fine powder to 1 pint of bran. The mixture should be scattered between and round the plants during fine weather; in wet it should be placed in small heaps and covered with a tile, slate or board. The slugs will be attracted to the bran bait and killed when they come into contact with the Meta. Autumn-sown onions and onions raised under glass are more likely to escape attacks by onion fly than those sown in the open in spring.

11. Avoid overcrowding by allowing sufficient space between rows and thinning early to a proper distance apart. Where there is room practice intercropping.

12. Sow in small quantities and at frequent intervals the crops that are likely to run to seed, so as to avoid waste on one hand and shortage on the other. Turnip, Spinach, Radish and Lettuce should be so treated.

13. Do not let the desire for flowers lead to encroachment upon the space necessary for vegetables.

14. Keep the Dutch hoe going among the crops so that all ground is hoed every two weeks.

15. Maintain a succession of crops. For instance, after early Peas, Early Potatos, and Broad Beans, sow Beet, Carrot, Lettuce and Cabbage and other Brassicas for winter use up to the end of the first week in August (end of July in north). The Beet (turnip-rooted) and Carrots may stand out all the winter, being pulled as required. Onions sown in the first week in August give Spring Onions (for which White Lisbon is best) and early bulbs in the following year. Keeping varieties sown at the same time give excellent results.

16. In August vacant ground should be sown with Mustard or Rye which should be dug in when about nine inches or a foot high. This will add humus-making material to the soil and as these plants absorb nitrogenous compounds likely to be washed out of the soil by winter rain they prevent this loss. As they decay after being dug in they will gradually part with this nitrogen for the benefit of following crops.

17. In autumn find out if the soil in the kitchen garden requires lime. If so give it a dressing of powdered chalk at the rate of ½ to 1 lb. to the square yard. If club-root has affected Cabbages, etc., use instead quick lime (i.e. unslacked lime) at the rate of ½ bushel to the

square rod (30 square yards). This should be put in a heap on the plot, covered with soil and left for three weeks, after which it should be spread evenly and dug in. Lime dressings should not be buried deeply.

To find out if lime is needed, half fill a cup with soil, and add to it a little weak spirits of salts (i.e. hydrochloric acid), two parts water, one part acid. If there is any effervescence the soil contains sufficient lime, if there is not, lime should be added, but it is better not to use lime immediately before the potato crop.

18. Fresh " seed " should be obtained for the potato crop. Scotch and Irish " seed " and " seed " from high altitudes usually gives higher yields than home-saved " seed."

19. Obtain the potato " seed " in good time and place it in shallow boxes with the " rose-end " of the tuber uppermost. (The rose end is the end with most eyes.) Place the trays of seed tubers in a light frost-free place to sprout. " Seed " with green sprouts gives a much higher yield than unsprouted " seed."

20. Seakale, Chicory and Dandelion may be " forced " without heat for winter use, either by covering the crowns with dry ashes or earth, or with pots made for the purpose. Chicory and Dandelion are excellent for salads. Rhubarb may be similarly treated to secure early stalks.

21. The dry seeds of several varieties of French Beans (haricots) are nutritious and palatable. The Dutch Brown bean and the little white Comtesse de Chambord are probably the best, but other varieties may be used. The beans are sown at the usual times ; the pods are not picked but allowed to ripen ; in September the plants are pulled up, spread out to dry and later the seed is shelled out. If green pods are picked the ripening is delayed and there is more risk of loss of crop of dried beans through bad weather.

22. Spare no pains in storing those crops that need it in such a way as to keep them uninjured. It is false economy to neglect the best methods of storage after the trouble and expense of producing the crops.

IV. FRUIT TREES AND SMALL FRUITS.

Strawberries.

1. Hoe the ground before mulching and strawing and thus prevent weeds from appearing before the fruit is gathered.

Red Currants.

2. Prune back the shoots of red currants before netting. This reduces the chance of damage by aphides and lets the sun into the bushes.

Black Currants, Raspberries, Blackberries, Loganberries.

3. The old wood must be cut out or the bushes will be spoiled. It is best done soon after the crop is gathered. Encourage young growth by liberal manuring. Do not dig close to raspberries.

General.

4. Hard prunings are best burned. Soft prunings should be added to the compost heap.

5. Get rid of consistently unfruitful trees.

6. Deal with pest and fungus attacks promptly. Use an approved winter wash where aphis or winter moth attacks have occurred. See pamphlet on Keeping Orchards Clean.

7. Peaches and Nectarines and other wall trees must not be neglected, otherwise they will be ruined. Attend to pruning and training in good time.

8. If Peaches and Nectarines have been attacked in previous years by leaf curl, spray in mid-February with Bordeaux or Burgundy mixture.

9. Branches of Plums, etc., that have been attacked by silver-leaf should be pruned back beyond the point where a brown stain shows in the wood. All wounds above ½-inch in diameter made in pruning, etc., should be covered with lead paint.

10. Established standard and bush fruit trees need not be pruned except for the removal of diseased or crossing branches.

11. Summer pruning of trained Apple and Pear trees (espaliers, cordons, etc.) must not be neglected. Leave the leaders untouched.

12. See that no diseased, damaged or bruised fruit is put into the fruit store. Wrapping fruits in greased paper is an aid to their keeping.

13. Bottle or otherwise preserve as much fruit as possible. Bottling without sugar is possible.

V. GLASS HOUSES.

1. Raising plants for bedding out should be discontinued.

2. Decide what plants can be dispensed with and which must be retained.

3. Bring together those left after the weeding-out process and close houses left empty.

4. The houses closed should be those heated by one boiler and the water should be run out of the pipes as a precaution against frost damage.

5. Where valuable collections of plants have been brought together, every effort should be made to save them, for to lose them means a serious loss both of capital and of plants of intrinsic interest. Something may often be done by reducing the number of specimens of any one kind.

6. Give up the early forcing of Vines, Peaches, Nectarines, Strawberries, Figs, Melons, Cucumbers, Beans, etc. Such work is costly in fuel and labour and adds little to essential food supplies.

7. Peaches and Nectarines in houses should be grown without artificial heat.

8. Grapes, except Muscats and a few other tender varieties, may

be grown without artificial heat in spring and summer, but are assisted greatly by its use during the ripening period.

9. Unheated houses may be used for tomatos in summer and for forwarding seedlings of Onions, Leeks and Cauliflowers. For Lettuce under glass see Pamphlet in list below.

10. Exercise the greatest economy in the use of fuel. Burn coke or coal separately; keep the fire near the furnace door so that the flames travel over the whole length of the boiler. Stoke with an eye on the weather and let sunshine help to economize fuel.

If the day seems settled and likely to be warm, after raking out clinkers and ashes, add only enough fuel to keep the fires burning.

Keep fires clean and clear. Bank up fires last thing at night, using coke that has been broken rather fine, putting the finest all over the top and patting it down close. If anthracite is used put on the largest pieces possible last thing at night. With a good boiler and good banking up the temperature may be kept within a few degrees for 10 to 12 hours.

In the day-time keep a small bright fire by putting the fuel on a little at a time and often.

Close the dampers nearly up when the fire brightens and so preserve the heat.

Remember that boilers free from fur take less fuel than dirty ones to produce the same results. Flues must be kept clean.

11. Ordinarily all painted surfaces of greenhouses should be repainted every three years and the work so arranged as to be distributed over that period. The best time for external work is August, when crops and plants require comparatively little attention. One coat instead of two or three should be made to suffice, the paint used being mixed a little thicker than when several coats are given.

LIST OF PUBLICATIONS.

THE R.H.S. GARDENERS' DIARY AND NOTEBOOK:

Contains information of great value, reminders of seasons' work to be done, and planting and sowing times.

Prices.

In Leather Cloth, with Pencil	2*s*. 0*d*.
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Hardy Fruits for Private Gardens. *Free.*
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MINISTRY OF AGRICULTURE—BULLETIN AND PAMPHLETS :

Food from the Garden. Growmore Bulletin No. 1. 3*d.* net.
A plan for continuous vegetable cropping of 10 perches. Full cultural details.

Vegetable Production in Private Gardens and Allotments. Growmore Leaflet No. 1.
A six-page abridgment of the above. *Free.*

All the above can be obtained from the Society's Offices, Vincent Square, Westminster, S.W. 1.

THE CHRYSANTHEMUM MIDGE.*

By H. F. BARNES, M.A., PH.D.

(Rothamsted Experimental Station, Harpenden.)

THE Chrysanthemum Midge is a small two-winged fly, with a red abdomen in the female, whose larvæ live in the tissue of the plant, causing cone-shaped galls. This insect has been recognized as a serious pest of glasshouse Chrysanthemums in the United States of America and Canada since 1915, although growers had noticed its presence some years previously. There have been two outbreaks in England, in 1927 and in late 1936. In the first, attempts at total eradication were successful; in the latter, although eradication is being attempted, the midge is still present in this country. It cannot be said to be firmly established, however, and, provided all growers take the necessary steps, it may still be possible to free this country of the pest. The midge has also been recorded on glasshouse Chrysanthemums in Denmark since 1934, in Sweden since 1935 and in Finland since 1936. It was further recorded from Northern Ireland in 1937. Both the English outbreaks have been traced to Chrysanthemum varieties imported from the United States. Although the origin of the other European outbreaks is not definitely known, it is considered likely that the midge arrived in Denmark with imported plants and has since been taken with Chrysanthemums into the other countries.

As soon as the second outbreak in England was discovered special permission was given to the writer by the Ministry of Agriculture to study this pest in England.

The first objects were to discover its host plant range and whether it would live on wild species of Chrysanthemums. The midge, besides attacking commercial varieties of autumn Chrysanthemums, including Koreans, was found to live successfully on *Chrysanthemum indicum*, one of the forebears of most commercial varieties, on *C. indicum* var. *azaleoides*, commonly known as *C. azaleanum*, and on *C. rubellum*, which until recently was erroneously known as *C. erubescens*. Although egg-laying took place on such Chrysanthemums as *C. Leucanthemum* (Ox-Eye Daisy), *C. cinerariaefolium* and *C. coccineum* (Pyrethrums), *C. maximum* (Moon or Shasta Daisy), *C. uliginosum* (Giant or Moonpenny Daisy), *C. coronarium* (Summer Chrysanthemum) and *C. frutescens* (Marguerite), no galls ever developed and the midge could not survive. Unsuccessful attempts were also made to breed the midge on *Matricaria inodora* (Corn Feverfew), *M. Parthenium* (Common Feverfew), *Anthemis Cotula* (Stinking Chamomile), *A. nobilis* (Common Chamomile), *Achillea*

---

* This species has usually been recorded as *Diarthronomyia hypogaea* F. Lw., but its true identity has not yet been decided.

Millefolium (Yarrow), Artemisia (Wormwood) and *Senecio vulgaris* (Groundsel). It would therefore appear that the midge that infests commercial Chrysanthemums is restricted to such plants and will not spread to common weeds or summer Chrysanthemums.

The third object of the investigation was to discover the life history of the midge in this country. It is now known that the midge breeds continuously throughout the year, newly emerged adult midges being found almost every day, even during frosty weather. Mating, however, and egg-laying do not take place until the temperature is slightly above freezing point. There are five generations a year under unheated glasshouse conditions, but under warmer conditions there were found to be eight. The generations are completed progressively more quickly as the summer reaches its height, the shortest one (late July to August) having taken only 26 days, while the longest one during the winter was 149 days. Roughly speaking, under glasshouse conditions and starting with eggs in late March, the first generation takes about 66 to 71 days to produce the first adult midge, the second generation 43 days, the third 30 days, the fourth 66 and the fifth 136 days. The midges from each generation emerge over a long period and so the generations overlap very much. Hence it is possible to have newly emerged midges and egg-laying going on all round the year.

Emergence of the midges takes place very early in the morning, more appearing on bright than dull days and more on warm than cold days. The adult midges usually die the day on which they emerge, this again depending on the brightness and the warmth of the day. Egg-laying starts soon after emergence and on bright summer days is very largely completed by noon, a large number having already been laid by 9 A.M. On the other hand, egg-laying in the winter or in dull cold spells in the summer continues all day and has even been known to continue into the third day.

The eggs are bright red and are tucked in among the buds, the folds of the young leaves, and the sepals of the flower buds, and occasionally also they are laid on the green stems. These eggs are just visible to the practised naked eye and, when once the eggs have been pointed out, they become a very useful way of discovering a midge attack. Over one hundred eggs are laid by a single female.

The larvæ hatch after 3 to 4 days in the summer but take up to 14 days in the winter, and within 24 hours the larvæ make their way into the plant tissue. Later, a definite cone-shaped gall develops. The galls do not always stand up perpendicularly from the leaf but sometimes lie parallel to the surface of the leaf, when they are not so easy to observe. The galls may be found on either the upper or lower side of the leaves. They also occur on the stems and on the sepals. The time taken for the galls to become visible varies with the season of the year. In the height of summer they are easily recognized 16 days after the eggs have been laid; in the winter, on the other hand, it is only after about 100 days or just over three months that recognition of attack is obvious.

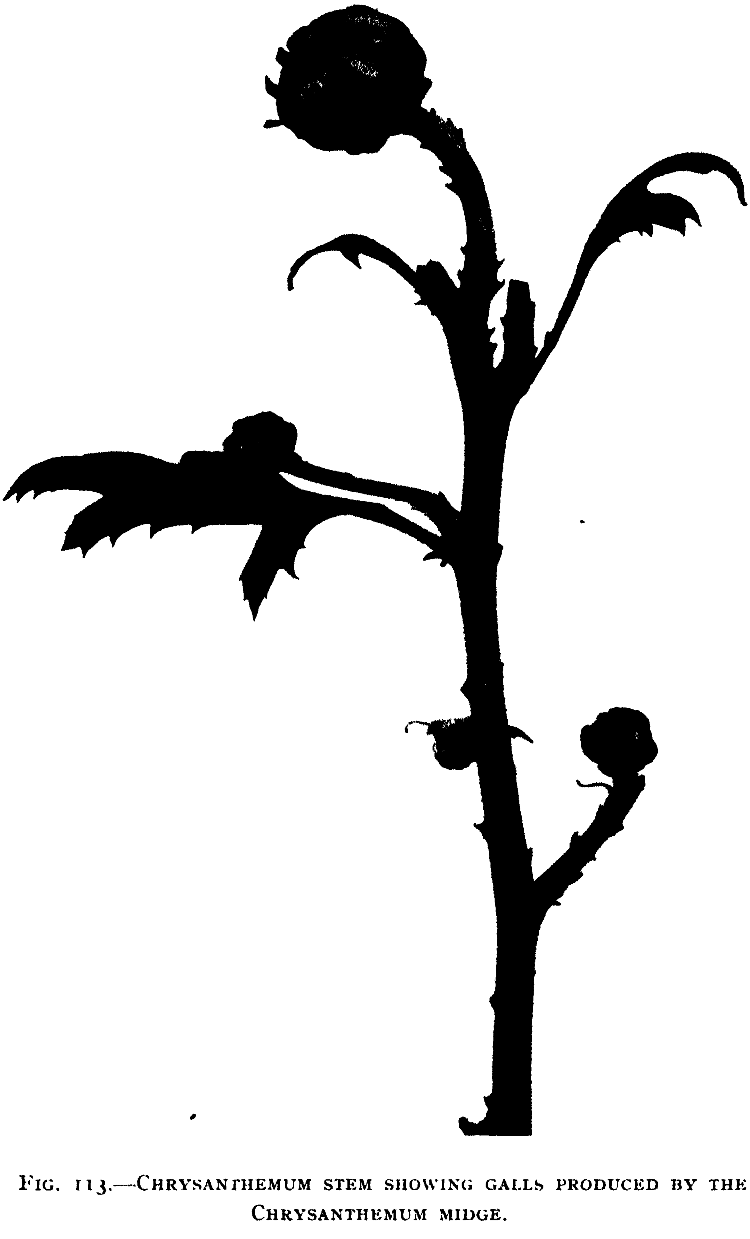

FIG. 113.—CHRYSANTHEMUM STEM SHOWING GALLS PRODUCED BY THE CHRYSANTHEMUM MIDGE.

[*To face p.* 504

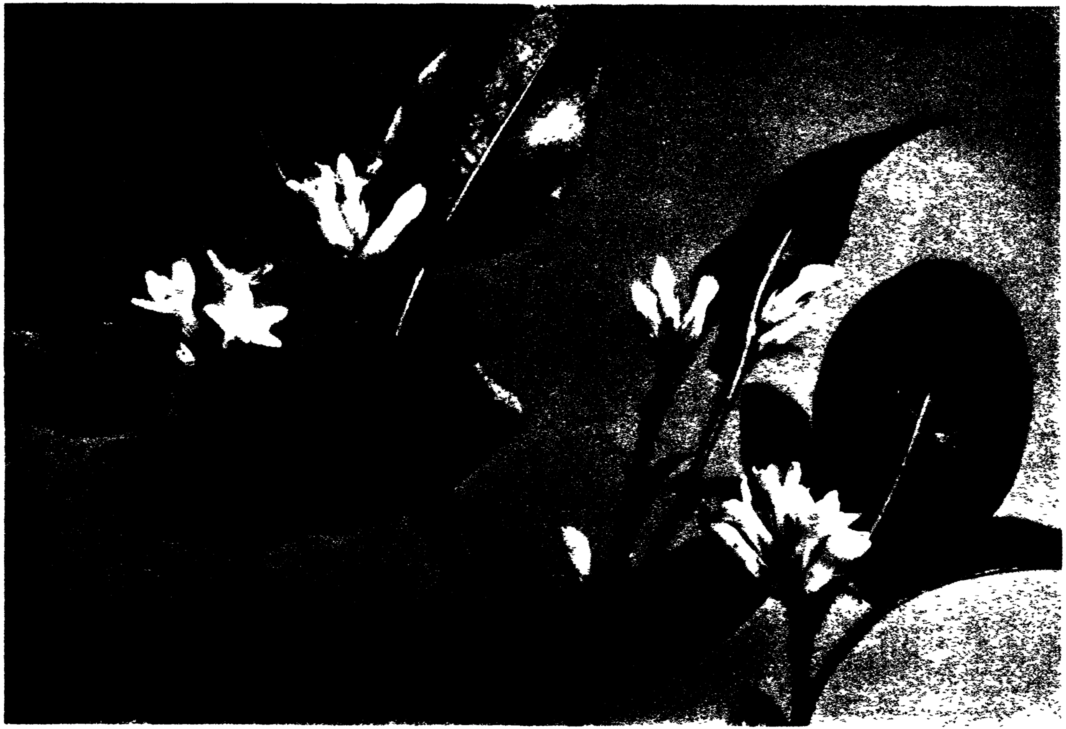

FIG. 114.—EPIGÆA REPENS
(See p. 507)

The pupal stage lasts 6 to 7 days in the warmest weather, but during the winter this stage may take up to six weeks. It has been found that galls on leaves and stems in the late autumn can produce adult midges up to the end of February even though the leaves and stems have become quite dead and brittle. Hence the need in any control measures for the destruction of all plant refuse.

The midge can survive out in the open throughout the winter in the young larval and gall stages.

The life history of this pest in England differs from that in the United States in so far as here the generations follow each other more and more quickly as the summer approaches, whereas in the U.S.A. during the summer there is an æstivation period when the midge breeds very slowly. Similarly, in that country there is an hibernation period in the winter when the midge develops very slowly. Thus in America there are three quick generations in the spring, one slow one in the summer, three fast ones in the autumn and one slow one in the winter. In England, as previously mentioned, there are five generations under unheated glasshouse conditions and eight under warmer conditions.

The damage caused by the midge is unsightly on the leaves and stems (fig. 113). When the infestation is severe, the stems are twisted and contorted and the flowers malformed, sometimes to such an extent that they do not open.

The next object of the investigation was to find out whether there were any parasites of the midge in this country and whether there were any other natural enemies. Very soon after the original material had been received a small Hymenopterous parasite * was reared from the galls. Besides this parasite whose larvæ live inside the midge larvæ, several predators were found. The common earwig eats the galls, including the larvæ and pupæ, leaving holes in their place. An Anthocorid bug and a Shield bug suck the eggs and emerging and ovipositing female midges. In addition, a velvety red mite eats the eggs and emerging females. However, it would appear at the present state of affairs that this parasite and these predators are of little importance.

The final object of the investigation was the control. Since the pest is not yet established in this country, every effort should be made to eradicate it entirely. Fumigation and spraying with nicotine are very important measures in serving to check the increase of the midge by killing the adults. The spraying would, in addition, kill the eggs. But these measures have to be taken every night for several weeks for total eradication, which is impracticable, and therefore they must be reinforced by the following. Dipping cuttings in nicotine (95 to 98 per cent.) 1 : 800 with soap (1 oz. to 1 gal.) for 5 seconds will kill most of the eggs and the very young larvæ to some extent, but this method is not effective against older larvæ and the galls.

The most effective measure is to cut off and destroy by fire all the

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* *Eutelus diffinis* Walker.

growth of infected plants above ground level. If cuttings are required to maintain the stock, the stools from such cut-down plants should be isolated in a glasshouse in which Chrysanthemums have not been growing for a fortnight. Any cuttings required can subsequently be taken from the new growth. This isolation glasshouse should be kept closed until all the Chrysanthemums have been cut down and the foliage and stems burnt, as otherwise there is a distinct possibility of adult midges finding their way to the new growth which will grow up from the stools. Above all, all plant refuse must be burnt and no odd leaves must be left to blow about the nursery.

If the cutting-down method is practised each winter by growers acting in unison, it should be possible to eradicate this pest and so prevent recourse to routine spraying to keep down the numbers of this undesirable insect. If one or two growers, however, fail to play their part, midges may spread from his nursery to others. The Ministry's regulations concerning the importation of cuttings should prevent any but very isolated fresh introductions.

EPIGAEA HYBRIDS.

By B. O. MULLIGAN, N.D.H.

IN 1928 Mr. W. J. MARCHANT, of Keeper's Hill Nursery, Stapehill, near Wimborne, Dorset, crossed *Epigaea repens* (fig. 114) with *E. asiatica* (fig. 115),* raising over a thousand seedlings of which none was similar to *E. repens* but all proved more amenable to cultivation ; the flowers were either white or faintly tinted pink. From this quantity one, which leaned most in character towards the mother parent, was selected for its larger and more numerous flesh-pink flowers thickly clustered towards the ends of the shoots. This plant, subsequently named ' Apple Blossom,' was distinguished by the entire absence of anthers and in many flowers also of filaments.

This peculiar character has however long been observed in *E. repens*, and Miss F. L. BARROWS has (in Contrib. Boyce Thompson Inst. VIII, No. 1, pp. 81–97, 1936) given a number of references to authors who discuss or mention this fact, beginning with A. MICHAUX in 1796 and concluding with her own experiences in 1935. The late Dr. F. V. COVILLE (in Bailey's Standard Cyclopedia of Horticulture II, pp. 1120–1, 1914) also remarked that the stamens in the female flowers are often reduced to mere rudiments of filaments, so that this peculiarity of ' Apple Blossom ' need not necessarily be regarded as due to its hybrid origin.

Among the offspring obtained by crossing ' Apple Blossom ' back with *E. asiatica* in 1931 was ' Aurora,' a plant more akin to the latter species than to *E. repens*, as one would naturally expect, since *E. asiatica* has been twice concerned in its parentage ; the photograph (fig. 116) however does not show this so clearly as the living plant. ' Aurora ' differs from *E. asiatica* in the fewer but larger, faintly scented rose-pink flowers on smooth or nearly smooth pedicels, the petals spreading and not reflexed as is typical of *E. asiatica*. As in ' Apple Blossom ' there are no anthers (fourteen flowers examined) and the stamens are glabrous or practically so, unlike those of either of the original parent species.

Whereas ' Apple Blossom ' may be described as an improved form of the North American ' Trailing Arbutus ' or ' Mayflower,' ' Aurora ' is notable for the bright pink colour of the flowers and the fact that they are much more visible than in *E. asiatica*. These two garden names have been published by Mr. MARCHANT in his catalogue of choice trees and shrubs, issued in October 1937. It is the purpose of this note to give descriptions of each hybrid, and a key to aid in their discrimination.

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* When it is deemed necessary to use a name of Latin form to include all hybrids between these two species it should be as follows, the diagnosis being based on the original hybrid, ' Apple Blossom ' :

Epigaea × *intertexta* ; hybrida nova hortensis inter *E. repens* L. et *E. asiatica* Maxim. artifacta. Ab illa foliis pedicellis sepalisque longioribus, plerumque floribus numerosioribus, ab hac petiolis longioribus, pedicellis magnopere brevioribus glabrisque, floribus suaveolentibus distinguitur.

It may not always be found simple to distinguish these two hybrids on the purely botanical characters shown in the key, but in addition to the most salient features indicated, the leaves of 'Aurora' are decidedly thicker, tougher and more conspicuously netted both above and below, as well as darker green than in 'Apple Blossom.' These points, together with the shorter petiole, all demonstrate the influence of *E. asiatica*, not so apparent in the floral parts.

Key to Species and Hybrids of Epigaea.

A. Pedicels thickly villous up to 1·5 cm. long; flowers deep pink to carmine, petals short (to 3 mm. long), reflexing.
  1. *E. asiatica* Maxim.

AA. Pedicels glabrous or nearly so, up to 5 mm. long; flowers from almost white to pale or flesh pink, petals longer (5–7 mm.), spreading.

B. Pedicels 2–3 mm. long; sepals imbricate only at the base, 6–7 by 2–3 mm.; flowers four to six.
  2. *E. repens* Linn.

BB. Pedicels 3–5 mm.; sepals imbricate in lower third to one-half, 7 by 3 mm. or more; flowers up to ten in cluster.

C. Petioles to 4 cm. long, peduncle to 1 cm., pedicels glabrous. Flowers lilac-scented. Leaves thinly coriaceous.
  3a. *E.* × 'Apple Blossom.'

CC. Petioles to 2·5 cm. long, peduncle 2–3 mm., pedicels glabrous or sparsely hairy towards the apex. Flowers very faintly fragrant. Leaves thickly coriaceous, reticulate on both sides.
  3b. *E.* × 'Aurora.'

'Apple Blossom' is a prostrate sub-shrub, the current year's shoots and petioles densely covered with spreading brown strigose hairs. *Petioles* up to 4 cm. long; *leaves* ovate, acute, apiculate, cordate, thinly coriaceous, up to 6·5 cm. long by 4·5 cm. wide, on both sides sparsely set with short dark brown strigose hairs, more copious on the veins beneath, the margin ciliate with mostly semi-appressed similar hairs. *Inflorescence* composed of dense terminal clusters of from five to ten flowers on shoots of the previous year; *peduncle* up to 1 cm. long, thickly covered with light brown strigose hairs, as are also the bract and bracteoles. *Bract* 7–10 mm. long, lanceolate, acuminate, dorsally keeled; *bracteoles* two, 8–11 mm. long, ovate-lanceolate, acuminate, strongly keeled, green. *Sepals* five, erect-spreading, greenish-white, or slightly rose-tinted, overlapping one another in the lower third or half, 7–11 mm. long by 4 mm. wide, ovate-lanceolate, acute or acuminate, glabrous. *Pedicels* 3–5 mm. long, usually reddish, glabrous. *Flowers* fragrant, lilac-scented, 1·5 cm. wide when expanded, the tube of the corolla white or occasionally tinted faint pink,

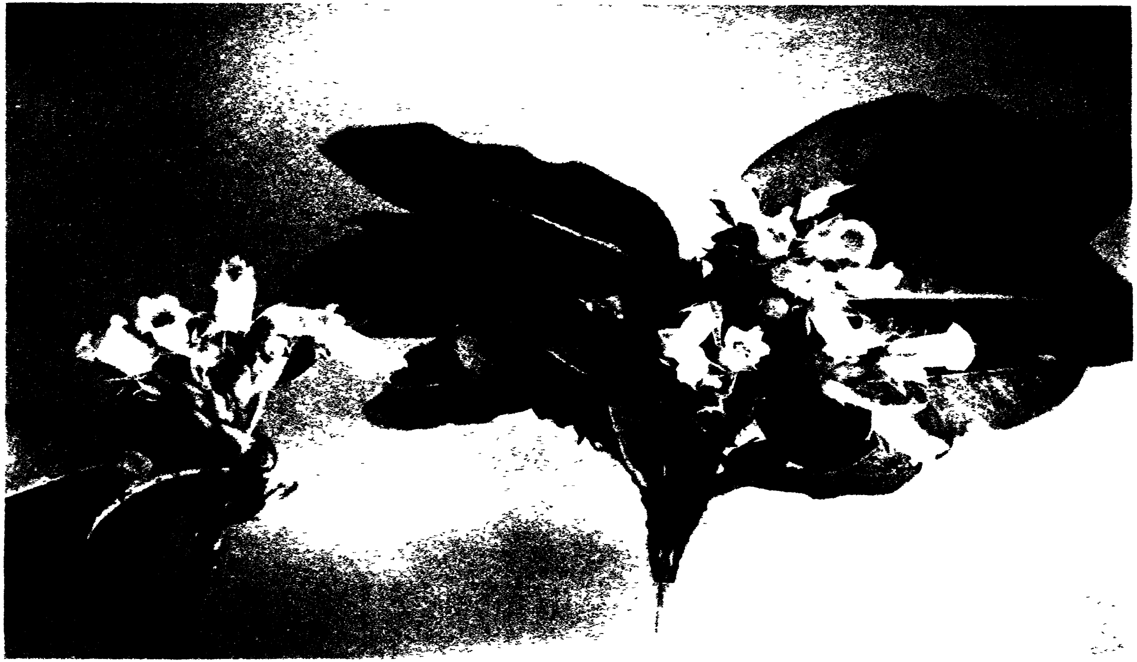

FIG. 115.—EPIGAEA ASIATICA.
(see p. 507)

[To face p. 508.

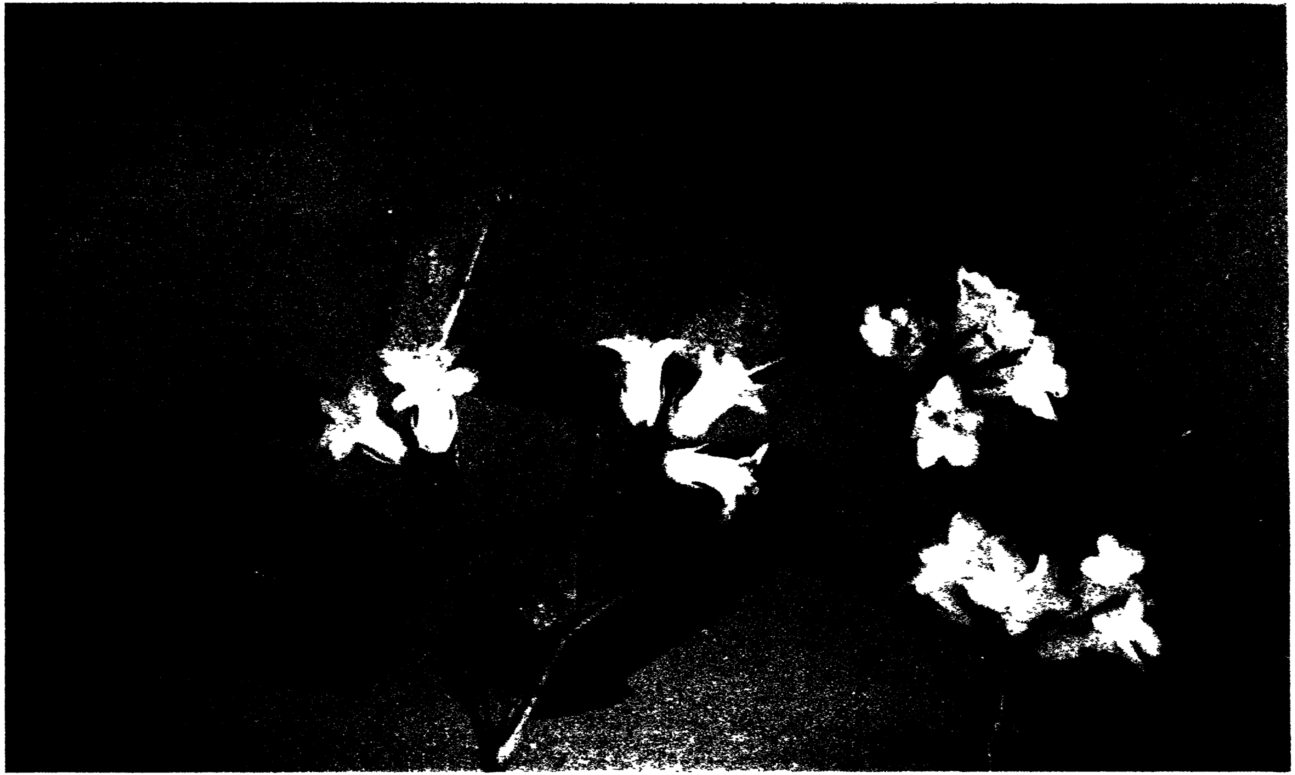

Fig. 110. Epigæa 'Aurora.'

Name.	Length of Petiole.	Leaves.	Flowers.	Pedicels.	Sepals	Corolla.	Style and Stigma.	Remarks
EPIGAEA REPENS	To 3 cm.	To 7 × 4 cm.; ovate–elliptic, thin and tough	4–6 (Peduncle 2–3 mm. long)	Glabrous, 2–3 mm long	Erect, slightly spreading; base pink-tinged. 6–7 × 2–3 mm. imbricate only at base	Tube white; petals spreading, white tinted flesh-pink, 5–6 × 3–4 mm.	Style 6 mm. long; stigma irregularly furrowed, scarcely wider than the style	Flowers scented. Filament villous in the lower half
EPIGAEA ASIATICA	To 1 cm.	To 8 × 3·7 cm.; elliptic, very tough and leathery, markedly dark green above	Up to 12	Densely villous, to 1·5 cm. long	Spreading widely with age; margin white, upper part pink. 6–7 × 3–4 mm.	Tube white in lower, pink in upper half; petals usually deep pink, reflexed, 3 × 4 mm.	Style 4–5 mm. long; stigma capitate, 5-ridged, reddish	Flowers not scented. Filaments silky-hairy in the lower half or more
EPIGAEA × 'APPLE BLOSSOM'	To 4 cm.	To 6·5 × 4·5 cm.; ovate, thin and tough	5–10 (Peduncle to 1 cm. long)	Glabrous; 3–5 mm long	Erect-spreading greenish-white or rose-tinted. 7–11 × 4 mm. imbricate in lower ⅓–½	Tube white or sometimes faintly pink; petals flesh-pink, 6–7 mm. long and wide	Style 5 mm. long; stigma 5-lobed, reddish	Peduncle to 1 cm. long. Flowers scented, 1·5 cm. wide. No anthers; filaments often absent
EPIGAEA × 'AURORA'	To 2·3 cm.	To 6 × 3·7 cm.; thick and leathery, dark green above	3–9 (Peduncle 2·3 mm long)	Glabrous, or with few white hairs towards apex, 3–5 mm. long	From lightly appressed to erect-spreading, margin white. 7 × 3–3·5 mm. imbricate in lower ⅓–½	Tube white, petals rose pink, 5–6 × 5 mm., spreading	Style 4·5–5 mm. long; stigma with 5 blunt spreading lobes, green	Peduncle 2–3 mm. long. Flowers faintly scented, 1·2–1·4 cm. wide. No anthers; filaments glabrous or almost so

8–12 mm. long, 4–5 mm. wide at the base, glabrous outside, densely villous within up to and including the lower half of the petals; *petals* ovate, 6–7 mm. long and wide, overlapping 2–2·5 mm. at their base, flesh pink. *Filaments* not always present, and if present only partly developed; *anthers* none. *Style* pale green, 5 mm. long, with a five-lobed reddish stigma; *ovary* covered with long white papillate and frequently clavate hairs.

In full bloom at Wisley end of March and early April 1937.

'Aurora' ('Apple Blossom' × *E. asiatica*) differs from 'Apple Blossom' in the following respects:

Petioles up to 2·3 cm. long; *leaves* ovate-elliptic, coriaceous, dark green above and conspicuously netted with impressed veins, below much paler but also reticulate, up to 6 by 3·7 cm., the upper surface verruculose with occasional short dark strigose hairs, the underside rather thinly strigose-hairy as in *E. asiatica*, the marginal cilia appressed. *Flowers* very faintly fragrant, in clusters of 3–9, subsessile on a bristly peduncle 2–3 mm. long. *Bract* 6–7 mm., *bracteoles* 6–9 mm. long. *Pedicels* either glabrous or with a few small glandular white hairs in the apical half. *Sepals* pale green with a narrow white margin, 7 mm. by 3–3·5 mm. *Corolla* tube 9–10 mm. long by 5 mm. wide at the base; expanded flowers 1·2–1·4 cm. wide. *Petals* rose-pink, the colour deepest around the margin, 5–6 mm. long by 5 mm. wide at the base, overlapping 1 mm. or less at each side. *Filaments* glabrous, or with a few weak basal hairs. *Stigma* green.

For the purpose of making a rapid comparison between the species and hybrids a table is given on p. 509.

SIMPLE PRUNING FOR BEGINNERS.

By E. A. BUNYARD, F.L.S.

THIS paper is written for those who have never pruned their own Fruit Trees before and deals with pruning only, not training and shaping of young Trees. Directions are reduced to a minimum; a shapely tree must be sacrificed temporarily for immediate fruit production.

APPLES AND PEARS.

Branch Thinning.

The simplest method is to thin the branches only. Aim to leave all branches one foot apart, and take out all which cross or rub each other and so ensure that every fruit will get sunlight some time in the day. Do not fear you will lose half your crop. The fruits that develop will be double the size and twice as good.

Minimum Pruning.

For those who are inexperienced in pruning a plan of minimum pruning has been devised.

Only the strong **upward growing** shoots are pruned (see later): all slender horizontal and short ones are left. This will give rather an untidy tree for a few years, but it can be got back into shape later.

Branch thinning should be done as well as minimum pruning.

Description of Apple and Pear Shoots.

A branch is furnished with side growths (or laterals). These are the fruit producers **so long as they are kept short.** If strong shoots are allowed to grow on these side growths, branches will be produced and upset the arrangement and balance of the trees. Prune therefore to keep these laterals short and furnished with fruit buds.

The laterals are of two kinds:

A. Shoots with smooth bark.
B. Shoots with wrinkled bark.

The wrinkled bark is due to the leaves on the shoot having been very close together; in the smooth-barked ones the leaves had been an inch or so apart.

When these laterals grow older, they, like the parent branch give rise to fresh shoots upon themselves, for instance a spur may grow on a shoot or one spur on another. The dart and flex will, in a year or two, have spurs growing upon them. I call each of these lateral growths 'compounds' as they are a mixture of different kinds of shoots growing upon each other. **The whole spur or bunch of shoots down to the branch is the compound.**

Each compound may be regarded as a little tree in itself growing on the branch. They must be spaced out so that they do not crowd one another on the branch, cut some right out at the base if they do. They should be carefully spaced so that all can get full sunshine.

THREE GROWTHS ON THE COMPOUND WHICH DO NOT REQUIRE PRUNING.

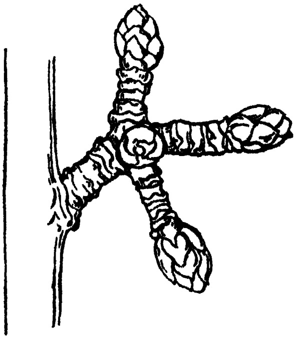

FIG. 117.—THE SPUR.

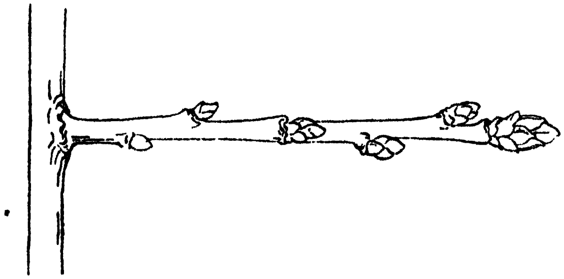

FIG. 118.—THE DART. STIFF AND THORNY.

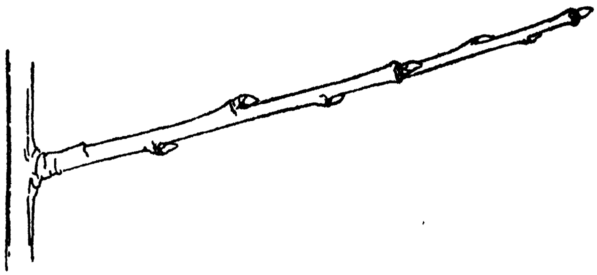

FIG. 119.—THE FLEX. SLENDER AND FLEXIBLE.

Exception to not pruning above. When the flex is on a **compound which has fruit buds as well,** prune to half its length.

The above instructions apply to Bush, Pyramid and trained trees generally. **Standards** and **Half standards** are best left unpruned save for thinning branches if necessary.

The Growth Shoot.

A strong stout shoot always growing **upwards.** It is stiff and stouter than the flex.

If pruned to bud, A, B, or C, another strong growth shoot would result.

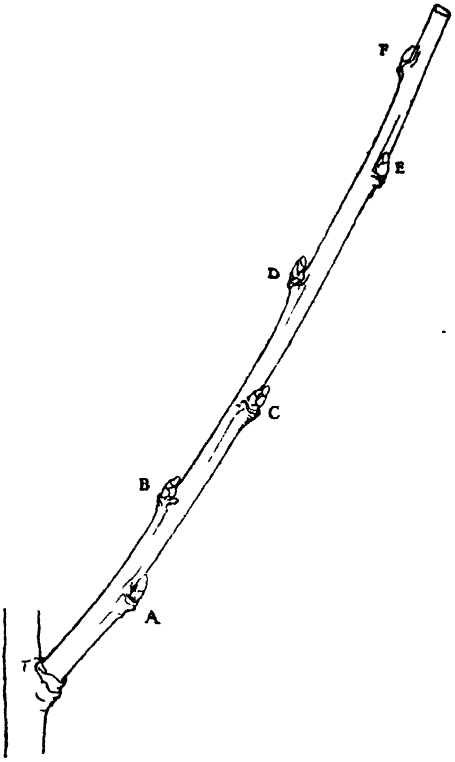

FIG. 120.—THE GROWTH SHOOT.

If left unpruned buds from B to F might make spurs or darts.

Pruning. If growing on a compound **which already has spurs or darts formed,** cut it right out to the base.

If it grows on a branch where there is room for a new compound, prune to bud F. The lower buds will then grow out into spurs or darts and it can gradually be shortened each year. Use only to make a new branch or a new compound.

How many Fruit Buds to each Compound ?

Three are enough. If more, cut away those farthest from the branch. Always aim at getting the fruit-buds nearer to the branch.

Restoring Old Compounds.

When a dense mass of spurs has been produced the compound may be twelve inches away from the tree and carrying far too many fruit buds. Fruit, if any, on these old compounds will be inferior.

Cut away the whole compound nearly to the branch, leaving ½ inch only of its trunk.

This drastic method will put new life into the tree and give fruit **in two years.** An alternative would be to cut away half of the spurs leaving the plumpest fruit buds only to fruit next year.

STONE FRUIT.

Plums and Cherries.

These bear fruit on short spurs and **also on the shoots of last year,** differing in this from Apples and Pears.

The wrinkled-bark spurs require no pruning.

Prune shoots as for Apples and Pears.

Mature Standard or bush trees had best be left alone. Thinning branches of stone-fruits brings various diseases and had better be omitted.

Wall Trees of Plums and Cherries.

If strong shoots have not been summer pruned, tie them in unpruned like Peach shoots. In two years they will fruit.

Peaches cannot have their pruning simplified, so are here omitted.

Morello Cherries which fruit on shoots of last year's growth require these to be preserved. Tie in to the wires and cut out those which fruited last summer.

BUSH FRUIT.

Gooseberries.

Gooseberries produce fruit on natural spurs and also on the lower part of their longest shoots. The spurs are left unpruned. In pruning a bush encourage the young growth from below. This will make new branches and in the course of a few years enable one to replace the old ones. **Prune all the side shoots on the branches back to two inches or so.** Still better, do this in July which will help the flower buds to develop better. Fan trees on walls can be treated in the same way, always encouraging fresh shoots to make new branches; the spurs do not last long as do those of Apples and Pears.

Spacing the branches.

In bush trees branches should be far enough apart to permit gathering without injury to the hands.

Black Currants.

These produce fruit on the one-year shoots and also on spurs on the older branches. These spurs do not last long and branches should be cut out and renewed every five years or so—not all at once, but one or two each year. Strong shoots which come up from the roots will make a good new branch. Cut them back half their length to make them branch out into three new shoots.

Red and White Currants.

Fruit produced on short spurs and shoots. The spurs require no pruning. The slender side shoots can be shortened to half their length, or cut down nearly to the base when fresh spurs will come next year. Owing to the longer life of the spurs, replacement of branches is less necessary than in Black Currants, but nevertheless it is desirable every six years to renew some.

Keep branches thinned as for Gooseberries.

LEADING SHOOTS.

So far all the instructions given have been for pruning the lateral side shoots.

There will usually be a strong growth at the tip of the branch. If the branch is long enough cut it down to a bud near the base, leaving an inch only. If there is room for the branch to be extended, cut it back to half of its length.

BERRY FRUITS.

Raspberries.

When the canes have fruited they die and so new canes must be always available for next year's crop.

Cut down to six inches all canes when fruit has been picked. Select your fresh canes for next year, say four to a clump, and cut out those not required. When the canes have finished growth, cut them down to four or five feet, according to the vigour of the variety. Suckers coming up from the roots should be removed so as to give all the light and air to the selected canes.

Blackberries and Loganberries.

Like Raspberries the canes die after fruiting and must be cut out. Suggestion. If on a fence, train the fruiting canes to the right and when the new growth of canes comes, train to left. This renders replacing canes much easier. Alternatively—if on a post have two posts, one for this year and one for next.

NOTE.—The Himalaya Berry is an exception and can be left unpruned.

HOW TO PRUNE.

Take the shoot to be pruned in your left hand straight in front of you. Place thumb just below the bud to which you intend to prune, thumb-nail facing you. This supports the shoot against the cut. Draw the knife towards you.

In Currants and Gooseberries we need not be so particular as to cutting just above the bud.

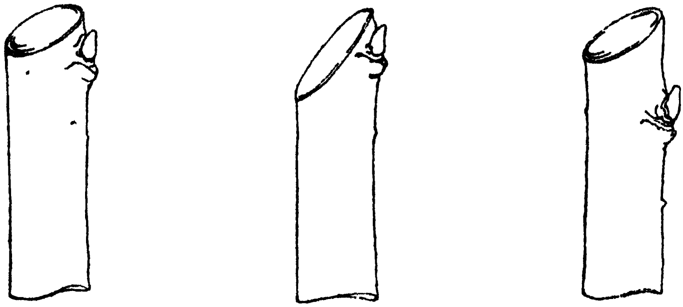

FIG. 121.

CORRECT ANGLE OF CUT.

WRONG. TOO FAR BELOW BUD.

WRONG. TOO FAR ABOVE BUD.

WHEN TO PRUNE.

The pruning may be done at any time in late autumn or winter. Even if the leaves have not fallen it will do no harm. Pruning in frost is not dangerous. Very late pruning—April—is not recommended except to check growth.

Knife or Secateurs.

The modern secateurs are as good as a knife and easier for the amateur, as a pruning knife requires some experience in sharpening.

Fig. 122 The Rock-garden Ponds at Wisley in May

FIG. 123.—LOOKING NORTH ACROSS THE ROUND POND AT WISLEY IN FEBRUARY.

[*To face p.* 517

A HISTORICAL REVIEW OF INTENSIVE VEGETABLE CULTIVATION.

By R. J. G. HOPP, Dipl.Hort.Dist. (Reading).

THE cultivation of vegetables dates back to pre-historic times and was firmly established in the earliest periods about which we possess records. We learn about the gardening of the ancient Egyptians from various papyri, some of which date back to 1800 B.C. According to one of these papyri, lettuce was already among the plants grown for medicinal purposes. Lettuce was also used on the tables of the Persian kings about 550 B.C., and several kinds of it, differing in colour, are mentioned by the Greek writers. There is little literature about kitchen gardens of the Romans in the time B.C., but we gather from the writings of PLINY, COLUMELLA, CATO, and others that there existed in the first and second century A.D. a good knowledge of gardening and its principles. There are, together with detailed descriptions of vegetables—such as asparagus, beet, cabbage, leek, endive, lettuce and others—instructions about their cultivation, time of sowing, kind of soil, manuring, water supply, altogether a knowledge which still served as a basis for the horticultural writers of the sixteenth and seventeenth centuries. Lettuce stood in high favour with the Romans. The varieties cultivated at the beginning of the Christian era are distinguished by colour, form of leaves, and country of origin. Certain varieties were known for the different seasons of the year. A stone or tile was placed on the plants in order to blanch them, to stop them from running to seed and to induce them to grow broader. At the time of the Emperor TIBERIUS cucumbers were "forced." They were grown in large boxes or baskets of dung, covered with soil; during cold days they were sheltered with thin plates of Lapis Specularia, and at night they were transported indoors. This is probably the first recorded attempt at "protected cultivation."

The Romans introduced a great deal of their art of gardening to various parts of Europe during the expansion of the Roman Empire, but in the centuries following the fall of the Empire, horticultural practice became generally neglected and was handed on mainly through the monasteries and courts of kings and noblemen. Some of the monastic writings, like the poem "Hortulus" by WALAFRID STRABO (see JOURNAL R.H.S., **47**, p. 133) (808–849), Abbot of Reichenau, are the oldest records of gardening after the time of the Romans. Of the vegetables introduced into England by the Romans, only such as the Brassica and onion tribes remained always in cultivation, while the more delicate vegetables would be lost after the retirement of the Romans from England. On the Continent, lettuce is mentioned by CHARLEMAGNE in the "Capitulare" (812), and, to give another reference, ALBERTUS MAGNUS (1193–1280), Bishop of Ratisbon, speaks of the "large-leaved, well known" salad which was planted on rich, well-watered land, "toto anno," during the whole year, and the aim was, through frequent transplanting, to obtain large heads, thick stalks and crisp leaves. Legend says that he revived the Roman practice of forcing fruit and flowers so successfully that many suspicious people charged him with witchcraft.

At the time of the arrival of the Normans in England, gardens for the production of vegetables to supply the public demand were probably already in existence there. Eight cotarii and their gardens, for example, are enumerated in the Domesday Book in the Manor of Fulham in Middlesex. Since we may assume that the cotarii produced in these gardens, up to five acres, more vegetables than they needed for their own consumption, we can thus trace the origins of English market gardening to a district which retained a prominent place in this respect until the growth of London forced market gardeners to go further afield. We have, however, no information of the cultural methods then in use. In the following centuries gardening in England suffered considerably under the general political conditions, wars, invasions, internal disturbances, and only the barest necessities were produced. A number of culinary plants went out of general cultivation and were not reintroduced until the reign of Henry VIII. Yet there existed already in the middle of the fourteenth century vegetable markets in London which were supplied by the gardeners of the earls, barons, bishops and citizens of London. This market was held opposite the Church of St. Austin, near the gate of St. Paul's churchyard; it grew and became so crowded and noisy as to interfere with passengers, and the "scurrility, clamour and nuisance of the gardeners, and their servants became so obnoxious to reputable people dwelling near, and so annoying to the priests, clerks and laymen, singing matins and mass in said church," that the mayor and aldermen were petitioned to interfere and abate the nuisance as we should say.

A very interesting record as to gardening in the fifteenth century exists in a poem written about 1440–1450 by MAYSTER ION GARDENER, and which gives full cultural instructions—

"How he schall hys sedys sowe / Of every moneth he most knowe
Both of wortys and of leke / Ownyns and of garleke
Parcely clarey and eke sage / And all other herbage."

The "herbage" includes "letows," "spynage," "radysche," and many other "herbys." There are also details of securing a supply of "wurtys" or "wortys" (cabbages) all the year round by a succession of sowings:

"Wurtys we most haue / Both to mayster & to knaue
Ye schul haue mynde here / To have wurtys yong' al tyme of the
yere,"

and a reference to the necessity of manuring by making " Beddys . . . wel wyth dyng." The mention of lettuce at this time is particularly interesting, for it is generally stated that it was not introduced into England until 1520 or 1562.

HUME in his History of England writes : " It was not till the end of the reign of HENRY VIII that any sallads, carrots, turnips or other edible roots were produced in England. The little of these vegetables that was used, was formerly imported from Holland and Flanders. Queen CATHERINE, when she wanted a sallad, was obliged to dispatch a messenger thither on purpose." Elsewhere " the unskilfulness of our gardeners " is blamed for this state of affairs, but we have seen that there existed already in the fourteenth and fifteenth centuries a sound knowledge of gardening which became more widely spread after the invention of the printing press. THOMAS TUSSER has to be mentioned here ; in his Hundreth good pointes of Husbandrie, 1557, he makes only a few remarks about vegetable crops, such as sowing of peas and beans in February, but in his Fiue Hundred Pointes, 1573, we find many instructions about gardening, cultural methods, manuring, etc. " The garden plot latelie well trenched and muckt . . ." reads one line referring to January work ; " Green peason or Hastings " are to be sown at Hallowtide (November 1) and " Graie peason or runciuals " at Candlemas (February 2) ; beans are also sown in January, and " cresis sowe with Lettice in the spring."

The general impetus which horticulture received during the reign of HENRY VIII was further accelerated by the influx of the Huguenots in the middle of the sixteenth century. More gardens in which vegetables were cultivated extensively were laid out mainly near Fulham and along the Suffolk coast. FULLER in his History of the Worthies of England, 1662, relates that gardening for profit was first brought into this country towards the end of the sixteenth century, " before which time great deficiency thereof in England." At that time " we hardly had a Messe of Rath-ripe Pease but from Holland, which were dainties for Ladies, they came so far and cost so dear. Since, Gardening hath crept out of Holland to Sandwich, Kent, and thence to Surrey, where, though they have given six pounds an aker and upward they have made their rent, lived comfortable, and set many people on work." With this improvement in practical horticulture " the embassies to Holland for a Sallad ceased."

Two outstanding figures characterize horticulture at the end of the sixteenth and in the first half of the seventeenth century—JOHN GERARD and JOHN PARKINSON. GERARD in his Herball, 1597, in common with other authors of the same and later periods, refers frequently in his descriptions of plants, cultural hints, and " vertues " to old writers, and it is not easy to decide how far his instructions are based on the actual practice of his time. To give an example : " Lettuce delighteth to grow, as PALLADIUS saith, in a manured, fat, moist and dunged ground : it must be sowen in fair weather in places where there is plenty of water, as COLUMELLA saith, and prospereth best if it be sowen very thin. It is certain, saith PALLADIUS, that lettuce may well be sowen at any time of the yeare, but especially at every first spring, and so soone as winter is done, till summer be well nigh spent."

Various advances in the production of early crops can be traced to the time of GERARD and PARKINSON; during this period hotbeds are first mentioned for the purpose of raising seedlings. Cauliflowers " must be sowne in Aprill, in a bed of hot horsedung, and covered with straw or such like, to keepe it from the cold, and frosty mornings." Cucumber, melon, and tomato seedlings were also raised in hotbeds, but there is no evidence that plants were brought to maturity in them until the early seventeenth century. The hotbeds were made up in the first half of April of " hot and new horsedung," between 3 and 4 feet high. " This is covered with the most fertilest earth finely sifted, half a foot thick." The beds were originally covered with " thick Mattrasses of Straw " laid on long rods supported by " forked stickes at eche corner " *, but at GERARD's time this primitive structure is somewhat modified and the beds are arched over with " hoops or poles, that you more conveniently cover the whole bed with Mats, old painted cloth, straw or such like." Other attempts at a " protected cultivation " were made during this period, continuing where the Romans left off. A large frame or box stood on " little round wheeles of wood " and was filled with " choyse earth," and at night was drawn " by man's strength into some low vaulted gallery joyning upon the garden." †

Such improvements were, of course, mainly for use in private gardens. But greater attention was now paid to the production of vegetables for public supply. In PARKINSON'S Paradisi in Sole, 1626, we can trace a system of intensive cultivation as carried out by " our chiefe Gardiners," the market gardeners round London, with " some artificiall helps," a system which is in principle the same as our present-day methods. The ground was dug up about Christmas and cast up in ridges, so that the extreme frosts in January would mellow the earth. Fresh stable dung was then laid down " neither too deepe nor too thicke," and covered " with the mould " a hand thick. Radish and lettuce are sown in these beds towards the end of January and early in February, protected from frost and winds by reed mats supported by strong stakes. After these crops have been taken off, " many doe use to sow Turneps on those grounds . . . and make the greater profit of the ground, by having two crops of increase in one yeare." We are probably right to assume that this method was carried out year after year on the same plot, so that the mixture of decomposed manure and soil became in time the " mould," the *terreau* in French gardens. Intercropping was carried out, but not in a very methodical way. Radishes, lettuces, onions, carrots and parsnips were sown together in the same bed and " drawne up and taken away as there is occasion to spend them." Cabbages are often planted round the borders of artichokes,

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* MOUNTAINE, The Gardener's Labyrinth, 1577.

† GERVASE MARKHAM, The English Husbandman, 1613.

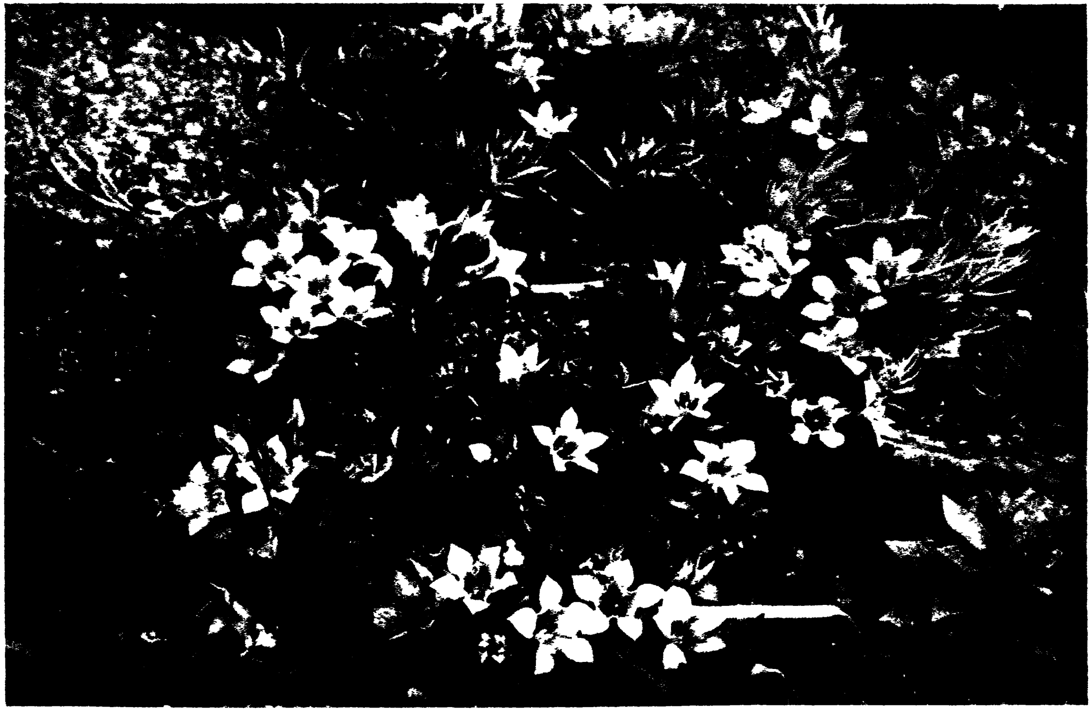

Fig. 124 -Gentiana Loderi in Major Stern's garden at Highdown, Sussex.

Fig 125 – Cyclamen europaeum in Major Stern's garden at Highdown, Sussex

[*To face p.* 521.

melons and cucumbers, "in that by this means so much ground will be saved, and the other things be no whit hindered thereby."

Various methods are used to whiten lettuce, as "raysing up earth like moale hills, round about the plants," and "tying up all the loose leaves round together." It is also recommended, if large leaves of the Cos Lettuce are desired, to "put upon it a clod of earth or some small tyle," a method which was practised by the Romans. An early variety of Pea was already known as 'Fulham Pea,' "because the grounds thereabouts doe bring them soonest for any quantity, although sometimes they miscarry by their haste and earlinesse."

An important improvement was introduced into England from France at the time of PARKINSON—the cloche. Little is known about the early history of cloches, but they are fully described by MOLLET.* PARKINSON mentions them in connexion with melons. Plants raised on a hotbed in April were to be moved out into very rich soil with a circle of dung about them and covered "with strawe (some use great hollow glasses like unto bell heads) or some such other things, to defend them both from the cold evenings or dayes."

Reference may be made here to the often claimed and disputed influence of the moon on plant growth, a belief which was very widespread during the Middle Ages. At one time practically all gardening operations, sowing, transplanting, grafting and harvesting appear to have been governed by the phases of the moon, and even by the movements of the planets. Many writers refer to the influence of the moon or give full instructions in this respect, like GERARD (Herball, 1597), Sir HUGH PLAT (The Garden of Eden, 1655), GERVASE MARKHAM (Maison Rustique, 1616), an anonymous publication, probably by MARKHAM (The Country-mans Recreation, 1640), REID (The Scots Gard'ner, 1683), and THOMAS TUSSER (Fiue Hundred Pointes of Good Husbandrie, 1573), the latter in his quaint rhymes, like:

> "Sowe peason and beanes in the wane of the moone,
> Who soweth them sooner, he soweth too soone. . . ."

In the second half of the seventeenth century the practical art of horticulture was more advanced in France than in this country. It was mainly JEAN DE LA QUINTINYE, head of the famous gardens of Versailles, who exercised the greatest influence on gardening in his own country and abroad. He provided little "sallets of lettuce" to the table of Louis XIV in January and February, and hearted lettuce at all other times of the year. Hotbeds were no longer used only for raising seedlings, but crops were now brought to maturity on them. For his forcing work, QUINTINYE used cloches and glass frames. The bell-shaped cloches were produced in the glassworks in Alsace and Champagne and brought to Paris by boat. The transport question probably accounts for the fact that the cloches were almost exclusively used by the Paris market gardeners, while frames were predominant in the rest of France. For the hotbeds which are usually 4 feet wide and 3 feet high a mixture of old and new horse- or mule-dung is used. *Terreau* is used in the same way as to-day. It is described * as " that dung, which having serv'd for Couches . . . is consum'd to that degree, that it becomes a sort of Mould. . . ." For the earliest supply of hearted lettuce at the end of March, seed is sown in December under bells on hotbeds, the seedlings are pricked out on other hotbeds, 20 to 25 under a bell and again transplanted, 5 to 6 plants under a bell. In cold weather protection is given with coverings of litter, or new heat is provided by placing new dung around the bed, these additions being at least 2 feet broad and as high as or higher than the original bed. " At this time they that employ themselves in rearing Novelties, spend the most part of each day in covering them at night, and uncovering them in the morning, or else all comes to nothing." For succession, the same cultural procedure is recommended from sowings made in January. These in turn were succeeded by lettuces sown in September, wintered in a sheltered border and transplanted in February–March to hotbeds and covered with cloches. A great number of Lettuce varieties was then in cultivation, some of which are still in use, like 'Crêpe,' 'Passion,' 'Gau' or 'Gotte,' 'Impériale,' etc., and there are special varieties for every season. During the early part of the year, lettuces were grown for cutting as " Sallets." Sown very thickly on hotbeds, the seeds having been sprouted beforehand, and covered with straw or cloches, they were cut within about 2 to 3 weeks after sowing. Besides lettuces, cucumbers, radishes, melons, asparagus, mushrooms and a great number of herbs were grown on hotbeds, " and all these long before Nature can afford them." Radishes were sown " among all manner of Seeds, they coming up so very quickly, that we have time to gather our Radishes before they can do any harm to the other Plants."

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* CLAUDE MOLLET, Théâtre des Plans et Jardinages, before 1613.

The development of horticulture in England from the middle of the seventeenth to the second half of the eighteenth century is linked up with the names of several horticultural writers, such as JOHN EVELYN, JOHN WOOLRIDGE (or WORLIDGE), and Professor BRADLEY. The protecting and forwarding of plants by artificial means was gradually being improved. The hotbed and its proper management now played a more important part in the kitchen garden than before, and, as in France, it was used to bring crops to maturity in them. The hotbeds, 4 to 6 feet high, are made of " dung and litter from the stables . . . some makes it of Barley straw, and the same mixt with Bran, because it keeps heat long; and its heat is not so excessive nor so noisome to plants as dung." † If no horse manure was available, the following mixture was advised: " Some horse litter, already cold; straw steep'd in Pond Water two or three days; Grass; Coal-Ashes; and, if they can be had, the Grains of Malt after brewing, or damaged Bran made very wet; if they are thrown together in a Heap, and well water'd, will ferment and heat as well as any dung can desire." * We have thus an early attempt to make synthetic manure. Tanners' bark also came into use for hotbeds, which was said to keep a steady temperature for a long time, and fern, chopped small and laid in a heap to ferment. The hotbeds were still, as a hundred years previously, covered with "bended sticks in the manner of a very low roof" † and covered with mats or straw hurdles as a protection against cold and wind. Frames were probably introduced from France about 1650; they were similar to those with which we are to-day familiar. Drinking glasses were used for protecting melon and cucumber seedlings, to be replaced by bell-glasses as the plants grew bigger. A picture in one of BRADLEY's books (1718) shows beside bell-glasses a row of small structures not unlike our present-day continuous cloches with one plant under each section. We come across various suggestions for improvements in the frames. One is to fix strong wire netting to the bottom of the frame to support a bed of earth. This, it is argued, saves transplanting, as the whole frame with the plants growing in them can be moved to a new hotbed when the first beds grow too cold, and has also the advantage that no heat of the hotbed is wasted immediately after making up, as the frame can be placed somewhat hollow from the hotbed until the "great heat be abated." Another suggestion is to bury an L-shaped pipe in the dung, one end connecting with the outside air, the other end being open in the frame. A hole in the top of the frame allows impure air to escape while fresh warmed air is constantly rising through the pipe.

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* JEAN DE LA QUINTINYE, The Compleat Gard'ner, trans. by London and Wise, 1699.

† JOHN REID, The Scots Gard'ner, 1683.

A great variety of vegetables and salad herbs were then grown on the hotbeds, mainly from January onwards: lettuces, radishes, turnips, spinach, kidney beans, melons, cucumbers, asparagus, mint, chervil and others. The cultivation of early cauliflowers was on similar lines to present-day methods. Sown in autumn they were brought through the winter by various methods of protection; lettuce was sown in August and transplanted to its permanent quarters to mature in spring, and it was also protected during winter by bell-glasses and glass frames, covered with straw during hard frost, to mature as early as February. Beans were forced and might be had at the end of April "if we have had courage enough to forward them by artificial heat, but that trouble and expense rarely turns to account." ‡ Methods of inter-cropping were gradually improved and specialized. Radishes and carrots were sown in the same bed, both in the open and on hotbeds; in the latter case the bed was covered in bad weather with mats supported on hoops, "for frames and glass would draw the carrots too much into leaf." § Lettuce was also sown among carrots together with radishes; onions were sown in March on asparagus beds; lettuce among all kinds

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* RICHARD BRADLEY, New Improvements of Planting and Gardening both Philosophical and Practical, 1726.

† ROBERT SHARROCK, The History of the Propagation and Improvement of Vegetables, 1672.

‡ RICHARD BRADLEY, The Gentleman and Gardener's Kalendar, 1718.

§ RICHARD BRADLEY, New Improvements of Planting and Gardening, 1726.

of root crops; early radishes between winter spinach and cabbages; and so on. Most of the cultural instructions referred to were meant for private gardens, and market gardening is only occasionally mentioned in the gardening literature of this period, but usually to give examples of good cultivation. From this we may conclude that the market gardeners, particularly those round London, not only kept step with the development of the horticultural art, but had evolved their own methods worth tracing. The kitchen gardens near Tuttlefields, Westminster, were famous, and so were the market gardens at Chelsea and Fulham where growers specialized in certain crops grown under cloches and frames covering large areas. The market gardeners of Middlesex paid special attention to manuring and spared "neither labour nor expense to procure this article," with the result that "to this manure and care of sowing seeds" they "owe their celebrity in the article of lettuces." *

WESTON, in 1773,† describes "the present methods of the London Kitchen Gardeners cropping their ground for a crop of Colly-flowers under glasses, and five other crops on the same ground." Cauliflowers were sown in August on an old hotbed; after one pricking out they were planted out in October and November, six under a cloche, and the cloches were set in rows, 4 feet between the glasses and 10 feet between the rows. The ground was then sown with lettuce and spinach. In March some of the cauliflowers were transplanted elsewhere to give a succession to the protected ones, and only two were left under each cloche. Cucumbers, sown in spring on hotbeds, were either planted between the rows of cauliflowers and the bell-glasses moved over them, or they were planted in the places of the cauliflowers as these matured. In May, endive was sown and planted in the middle of July in two rows, between the cucumbers. Cauliflowers from a spring sowing were also planted out in July to be ready to cut about Michaelmas. Cauliflowers under bell-glasses were generally considered a very profitable crop, and they were regularly exported to the continent. The earliest cauliflowers "are frequently sold for 2 or 3 shillings each," so that the return from this crop alone under the system described amounted to about £120 an acre, while costs of labour, seeds, manure and rent were £30 an acre. Various other early or forced crops, as peas, asparagus, melons, "pay so exceedingly well, that these are more so worthy of either the gardener's or the Gentleman-farmer's attention." Peas were sown in October in the open, transplanted in November in special pits, covered with glass. After planting the peas, cress, mustard and radishes were sown, and lettuce and asparagus planted between the rows. After the peas were gathered—end of February or early in March—the pits were used for growing melons, which were sown in February, and later on for raising cauliflower plants for planting under bell-glasses. The return for a pit of 100 feet length is given as £100 with annual expenses of £29:

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* PETER FOOT, General View of the Agriculture of Middlesex, 1794.

† R. WESTON, Tracts on Practical Agriculture and Gardening, 1773.

this at a time when a gardener received nine shillings a week. Early Horn Carrots were then sown as early as January on hotbeds to be ready in April, but they were still grown without frames, and straw was spread over the ground after they were sown. In order to forward spring cabbages it was the practice of London gardeners to tie the leaves together. Lettuces were then to be had during the whole winter through the use of hotbeds and frames.

Reviewing the position of the cultivation of early vegetables again during the first half of the eighteenth century, we find more or less the same cultural methods as during the previous period. Forcing was carried out extensively in the market gardens round London ; carrots, radishes and lettuces were grown together on hotbeds under lights from January on, and the beds were also still covered with hoops and mats, especially for carrots. Early radishes were grown on probably a centuries-old system which is to-day still practised in certain districts. Radishes were sown in January and the beds covered with straw about 6 inches thick ; after germination the straw was taken off during the daytime and replaced at night. As to cauliflowers, the date of sowing was strictly limited to between August 18 and 24 to raise plants to stand the winter under bell-glasses and which were to mature in May. LOUDON * describes fully the methods of the Dutch gardeners, also practised in France and in some English gardens, to produce excellent cabbage lettuce throughout the whole winter. Sown early in September, they were transplanted on exhausted melon beds where they received plenty of ventilation. From October on, when the lettuces began to form hearts, air was no longer given. If necessary the frames were lifted from time to time to prevent the plants from touching the glass. No water was given. In France the frames were said to have been introduced into commercial practice about 1780, after which, through a combination of frames and cloches, the Parisian *culture maraîchère* progressed rapidly. In the Horticultural Journal, 1839, the French method of growing lettuce during winter is described by POITEAU, who mentions that the same method was already practised there a hundred years previously. Sown under cloches early in October, pricked out under cloches and finally transplanted on hotbeds under frames or cloches, the first crop was ready to cut in February. The early outdoor supplies of lettuce were grown by the London market gardeners on lines similar to those which are to-day still characteristic of Middlesex and other districts near London, supposed to be the traditional way introduced by the Huguenots who came to England towards the end of the seventeenth century.

The intensive system reported by WESTON in 1773 is still in use at LOUDON'S time. Another system then consisted of sowing radishes, lettuces and onions on asparagus beds, and planting cauliflowers, and later on cucumbers, in the alleys between the beds. Apart from these definite systems, intercropping was practised very extensively to make the best of the ground.

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* J. C. LOUDON, An Encyclopædia of Gardening, 1834.

Certain changes in the methods of market gardening as a whole, and intensive cultivation in particular, set in during the second half of last century. With heavy applications of manure the land had been brought to and kept in a high state of fertility; intercropping played a very important part, far more so than to-day; early carrots, radishes, turnips, lettuces, were grown in frames; hotbeds for seakale came into use; the forcing of asparagus and rhubarb became a commercial proposition. The previously described systems of intensive cultivation remained in use until the growth of London gradually extinguished the old-established holdings—Mortlake, Battersea, Deptford, Bermondsey—and growers were forced to go further afield.

After about 1880 little "intensive cultivation" was practised. The cloche became neglected, frames were only used for raising plants for early planting out. Early produce came mostly from France. There were, however, during the last two decades of the last century, constant demands in the horticultural literature and in lectures for an increased cultivation of forced vegetables in general and of lettuces in particular. Early this century the idea of "French gardening"—radishes, lettuces, carrots, cauliflowers, etc, on hotbeds under cloches and lights—was widely advocated. Organized visits were paid to France to study the methods of the *maraîchers* near Paris. Many books were published on the subject and numerous French gardens started, but often by inexperienced people who expected large returns for a small capital outlay. The whole method became highly overrated, and most of the newly started enterprises resulted in failures, as generally the French methods were copied without trying to adapt them to English conditions. Only a few growers who started "French gardening" in the years immediately before the Great War have carried it out ever since, and it was not until the introduction of import duties on vegetables in 1931 that the cultivation of early vegetables and salads under glass—French lights, Dutch lights, bell-glasses, continuous cloches—coupled with the latest developments in soil heating and overhead irrigation, received a new strong impulse, resulting in the considerably increased production of early produce which we are now experiencing.

There is one method of protecting and forcing which has not been mentioned in the previous review—glasshouse cultivation, because commercial glasshouses were not erected until the middle of last century, and a brief outline may be appended here. Structures which may be called the forerunners of our glasshouses can be traced back to 1562. These buildings were little more than sheds, originally without windows. PARKINSON was the first in this country to mention that these structures were heated. Glass roofs were not introduced until the early eighteenth century. Various methods were tried to apply heat to the houses—burning of wood, charcoal, turf or peat; fermenting tan or manure; burning of candles. A furnace or oven with flues in the walls was the next step. Steam and hot water as means of heating appeared only fairly late. The former is said to have been first employed in 1788; the idea itself is, however, still older. PLAT (The Garden of Eden), 1655, advises in order to have roses and carnations growing in winter, to place them in a room that may be kept warm either with a dry fire "or with the steam of hot water conveyed by a pipe fastened to the cover of a pot, that is kept seething over some idle fire." Hot water was first used for heating hothouses in France in 1777 and in England in 1816. The Horticultural Society of London did not start trials with steam for heating houses until 1832; but "after repeated trials, during 2 or 3 months, the apparatus having once exploded, and proving at all times unmanageable, the plan was abandoned." *

The glasshouses were mainly used for forwarding fruit and flowers and for protecting exotic plants. Vegetables grown in houses are only mentioned towards the end of the eighteenth century, these being French beans, peas, cucumbers and lettuce.

A forerunner of our modern overhead irrigation system is described in 1817 as a method of conveying water to plants in houses. A ½-inch lead pipe running through the house "is perforated with minute holes, through each of which the water, when turned on, issues in a fine stream, and, in descending, is broken, and falls on the plants in a manner resembling a gentle summer shower."† The pressure was produced by fixing the reservoir sufficiently above the pipe.

Hitherto glasshouses had not been used at all or only to a very small extent by market gardeners. But after Sir JOSEPH PAXTON had proved that it was possible to cover large areas with glass structures the idea was taken up by growers, and the first commercial glasshouses were erected at Tottenham in 1856, Swanley and Worthing following soon afterwards. From these beginnings an industry developed rapidly, and the area covered with commercial glasshouses in Great Britain to-day approaches 4,000 acres.

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* Trans. Hort. Soc. II, Second Series, 1842.

† SABINE, Account of a method of conveying water to plants in houses, Trans. Hort. Soc. III, 1820.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Chrysanthemum 'E. Crossley.' A.M. September 28, 1939, for exhibition. Raised and shown by Messrs. J. and T. Johnson, Tibshelf, Derbyshire. An early-flowering variety with stout stems 18 inches long, and rather large foliage, widely spaced; flowers incurved, 5 inches across; petals very broad, deep rich chestnut-crimson, with a dull old gold reverse.

Chrysanthemum 'Golden West.' A.M. September 28, 1939, for exhibition. Raised and shown by Messrs. J. and T. Johnson. An early-flowering variety with stout stems 18 inches long, and rather small foliage; flowers 5 to 5½ inches across; inner petals incurved, outer reflexing of rich old gold, tinged scarlet. Seedling × 'September Glory.'

Chrysanthemum 'Harbour Light.' A.M. September 28, 1939, for exhibition. Raised and shown by Mr. H. Shoesmith, Mayford, Woking. An early-flowering variety with stiff stems 18 inches long, and evenly spaced, medium-sized foliage; flowers 5½ inches across, inner petals incurving, outer somewhat reflexed, of a rich orange-flame shade with an old gold reverse.

Chrysanthemum 'Mavourneen.' A.M. September 28, 1939, for exhibition. Raised and shown by Messrs. J. and T. Johnson. An early-flowering variety, with stiff stems 18 to 24 inches long, foliage of medium size; flowers 5 to 6 inches across, flattish; petals long, broad, Fuchsia-purple between H.C.C. 28/2 and 28/3. 'Rose Princess' × Seedling.

DAHLIAS AT WISLEY, 1939.

THE trial of Dahlias was carried out at Wisley as in former years, and they again made good growth and flowered freely. Two hundred and forty-five varieties were included, of which sixty-one had been selected by the Joint Dahlia Committee at Vincent Square in 1938, the remainder being grown for comparison or further judgment, most of these having received awards in former years.

The Joint Dahlia Committee made their final recommendations for Awards on September 18, 1939. The National Dahlia Society's Gold Medal for 1939 was not awarded. The report, if read in conjunction with the 1938 report (vol. **64**, p. 139), gives the present condition of the trials, the varieties recommended for awards, those retained for further consideration and comparison, and those discarded.

Single.

The following variety has been discarded :

GLORIANA

Mignon Single.

The following variety has been discarded :

PINK GEM

Small-flowered Pæony.

Newport Gem (raised and sent by Messrs. W. Treseder of Cardiff). **A.M.** August 28, 1939.—4 feet. Flowers 3½ to 4½ inches diameter ; bright rich scarlet ; petals semi-channelled, outer reflexing ; free and erect, on 9- to 14-inch stalks, well above the purplish-brown foliage. (**H.C.** 1937.)

Liberty Silk (raised and sent by A. J. Cobb, Esq., of Reading). **H.C.** August 28, 1939.—4½ feet. Flowers 4 to 4½ inches diameter ; azalea-pink (H.C.C. 618), on an apricot ground (H.C.C. 609) ; petals flat ; free and erect, on 9- to 15-inch stalks, well above the foliage.

The following variety has been retained for future judgment :

D. E. SMITH (Cobb)

The following varieties have been discarded :

DANEWAY, **H.C.** 1936
LEMON BEAUTY, **H.C.** 1936
LOVEGOLD, **A.M.** 1935
PINKIE, **H.C.** 1935
WINNIE GRIFFITHS

Dwarf Small-flowered Pæony.

The following varieties have been discarded :

MASONIC GEM
PIGMY, **H.C.** 1935

Large Informal Decorative.

Consul Generaal Quist (raised, introduced and sent by Messrs. J. G. Ballego of Leiden, Holland). **A.M.** September 18, 1939.—4½ feet. Flowers 6 to 8 inches diameter ; white, lightly flushed with carmine (H.C.C. 21/3), base of petals sulphur-yellow (H.C.C. 1/2) ; petals curled and twisted at tips; free and erect, on 9- to 12-inch stalks, well above foliage.

Lady Clive Wigram (raised and sent by Messrs. J. Stredwick of St. Leonards-on-Sea). **A.M.** August 28, 1939.—7 feet, very vigorous. Flowers 7 to 8 inches diameter; soft pinkish-buff on a pale yellow ground, tips of florets paler; free and erect, on 8- to 14-inch stalks, well above foliage. (**H.C.** 1937.)

Formality (raised and sent by Messrs. J. Stredwick). **H.C.** September 18, 1939.—4 feet. Flowers 7 to 8 inches diameter; tips of florets sulphur-yellow (H.C.C. 1/2), flushed at middle fire red (H.C.C. 15/1); margins of florets recurved and twisted at tips; free and erect, on 9- to 12-inch stalks, well above foliage.

The following variety has been retained for future judgment:
National (Stredwick)

The following varieties have been discarded:
Gladys Clark
King George
Nagel's Giant
Pink Giant
Rosalia

Medium Informal Decorative.

Intensity (raised and sent by Mr. J. T. West of Brentwood, Essex). **A.M.** September 18, 1939.—4 feet. Flowers 5 to 6 inches diameter; bright glowing scarlet; free and erect on 7- to 13-inch stalks, well above foliage.

Modern Times (raised and sent by Messrs. de Ruyter Bros., Oegstgeest, Holland). **A.M.** August 28, 1939.—5 feet. Flowers 5 to 6 inches diameter; bright rich scarlet; tips of florets creamy-white; very free and erect, on 6- to 11-inch stalks, well above foliage.

Astarte (raised and sent by Messrs. D. Bruidegom of Baarn, Holland). **H.C.** August 28, 1939.—4 feet. Flowers 6 to 7 inches diameter; nasturtium red (H.C.C. 14); margins of florets recurved; very free and erect, on 9- to 12-inch stalks, well above foliage.

The following varieties have been discarded:
Bridesmaid, **A.M.** 1934
Lady Snagge, **A.M.** 1932
Len Hutton
Miss Wilrijck
Scarlet Leader
Sonnet

Small Informal Decorative.

Towneley Orange (raised and sent by Mr. J. F. Barwise, Towneley, Burnley). **H.C.** September 18, 1939.—3½ feet. Flowers 3½ to 4 inches diameter; bright rich orange-scarlet; florets channelled; free and erect, on 6- to 12-inch stalks, well above foliage.

The following variety has been retained for future judgment:
Hurstwood (Barwise)

The following varieties have been discarded:
Braywick Bedder
Crimson Glorious
Dyneley
Ethel Windibank, **H.C.** 1934
Gladness, **A.M.** 1932
Hockley Bedder
Hockley Gem
Kristina
Molly Plowman, **H.C.** 1936
Naomi, **A.M.** 1934
Onaway
Tip Top
Towneley Cerise

Dwarf Informal Decorative.

The following variety has been discarded :

BRENTWOOD BEDDER

Small Formal Decorative.

The following variety has been retained for future judgment :

LADY SCARLETT (Barwise)

The following varieties have been discarded :

ALPHA
BOUNTIFUL, **A.M.** 1936
INDIAN, **H.C.** 1932
JEANNIE, **H.C.** 1936
MRS. C. HAY, **A.M.** 1931
MRS. F. G. PRESTON
NETTA
OLIVE HEARN
PRINCETOWN, **H.C.** 1936
TIPSY, **A.M.** 1923

Dwarf Formal Decorative.

The following variety has been discarded :

BRAYWICK BEDDER

Pompon.

Alloway (raised and sent by Messrs. Torrance and Hopkins, Busby, Glasgow). **H.C.** August 28, 1939.—4 feet. Flowers 2½ inches diameter ; tyrian rose (H.C.C. 24) ; free and erect, on 9- to 12-inch stalks, well above foliage.

Andrew (raised and sent by Mr. J. S. Wallis, Church Street, Histon, Cambs). **H.C.** September 18, 1939.—4 feet. Flowers 2½ inches diameter ; bright rose ; very free and erect, on 9- to 12-inch stalks, well above foliage.

Little Pat (raised and sent by Mr. H. T. Glower, St. Helen's Wood Road, Hastings). **H.C.** August 28, 1939.—4 feet. Flowers 2 inches diameter ; crimson on a yellow ground ; free and erect, on 9- to 12-inch stalks, well above foliage.

The following varieties have been discarded :

HOW SWEET
ORBIT
QUILL
SNOW WHITE
TARN HOUS
TOGO

Star.

The following variety has been discarded :

GATWICK STAR

Large Semi-Cactus.

Grand (raised by Mr. Czernicki-Carlée, introduced and sent by Messrs. H. Carlée, Haarlem, Holland). **A.M.** September 18, 1939.—5 feet. Flowers 7 inches diameter ; turkey red (H.C.C. 721) ; free and erect, on 9- to 15-inch stalks, well above foliage.

Jessie King (raised and sent by Messrs. J. Stredwick). **A.M.** August 28, 1939.—4 feet. Flowers 6 to 7 inches diameter, tips of florets rose madder (H.C.C. 23/1), deepening to a darker shade of

H.C.C. 23; free and erect, on 9- to 16-inch stalks, well above foliage.

Snowball (raised and sent by Messrs. J. Stredwick). **A.M.** September 18, 1939.—4½ feet. Flowers 6 to 7 inches diameter, white; free and erect, on 6- to 9-inch stalks, well above foliage.

Beauty of the Garden (raised and sent by Messrs. D. Bruidegom). **H.C.** September 18, 1939.—4½ feet. Flowers 7 to 8 inches diameter; bright light rosy-cerise; free and erect, on 9- to 12-inch stalks, well above foliage.

Dr. Derrick Martin (raised and sent by Messrs. J. Stredwick). **H.C.** September 18, 1939.—6 feet. Flowers 7 to 8 inches diameter; bright sulphur-yellow (H.C.C. 1/2); free and erect, on 12- to 15-inch stalks, well above foliage.

Enkart Prima (raised by Mr. V. Enkart of Belgium, introduced and sent by Messrs. J. G. Ballego, Leiden, Holland). **H.C.** August 28, 1939.—4½ feet. Flowers 6 to 8½ inches diameter; apricot (H.C.C. 609/2) on sulphur-yellow (H.C.C. 1/2), inner florets of a brighter shade of sulphur-yellow; free and erect, on 9- to 14-inch stalks, well above foliage.

The following varieties have been discarded:

RAPTURE	ROBERT DAVIDSON, **H.C.** 1936

Medium Semi-Cactus.

Deurne's Pink Beauty (raised and sent by Messrs. E. and A. Berckelaers, of Deurne lez Anvers, Belgium). **H.C.** September 18, 1939.—4 feet. Flowers 5½ to 6 inches diameter; Neyron rose (H.C.C. 623/3) on sulphur-yellow (H.C.C. 1/2); free and erect, on 9- to 16-inch stalks, well above foliage.

Marjorie Spencer (raised and sent by Messrs. J. F. Spencer of Hockley, Essex). **H.C.** August 28, 1939.—3½ feet. Flowers 5½ inches diameter; crimson (H.C.C. 22), tips of florets paler; very free and erect, on 8- to 12-inch stalks, well above foliage.

Pier Gynt (raised and sent by Messrs. P. Dekker of Velsen, Holland). **H.C.** September 18, 1939.—4 feet. Flowers 6 inches diameter; fire red (H.C.C. 15); free and erect, on 9- to 16-inch stalks, well above foliage.

Punctueel (raised and sent by Messrs. P. Dekker). **H.C.** September 18, 1939.—4½ feet. Flowers 5 inches diameter; bright sulphur-yellow (H.C.C. 1/2); free and erect, on 6- to 9-inch stalks, well above foliage.

The following variety has been retained for future judgment:

KANAKA

The following varieties have been discarded:

FIRERAYS

FLEURISTERIE ST. PIERRE

G. J. MENDEL

GOLDEN GLORY

Small Semi-Cactus.

Peaceful (raised and sent by Mr. J. T. West). **A.M.** September 18, 1939.—3½ feet. Flowers 4½ inches diameter; light rose-pink on orange; very free and erect, on 7- to 10-inch stalks, well above foliage.

Kendal Beauty (raised and sent by Messrs. Clarence Webb of Kendal). **H.C.** September 18, 1939.—4 feet. Flowers 4½ inches diameter; rose bengal (H.C.C. 25/3), shading to sulphur-yellow (H.C.C. 1/2) at base of florets, inner florets of a creamy shade; free and erect, on 9- to 14-inch stalks, well above foliage.

Little Diamond (raised and sent by Messrs. D. Bruidegom). **H.C.** August 28, 1939.—3 feet. Flowers 4½ inches diameter; rose bengal (H.C.C. 25/2) at tips of florets, shading to lemon-yellow (H.C.C. 4/2) at their base; free and erect, on 6- to 10-inch stalks, well above foliage.

Paula Deetjen (raised by Mr. Mayer Gmelin, introduced and sent by Messrs. W. Topsvoort of Aalsmeer, Holland). **H.C.** September 18, 1939.—5½ feet. Flowers 4½ inches diameter; sulphur-yellow (H.C.C. 1/2) overlaid with carmine (H.C.C. 21/2); free and erect, on 12- to 18-inch stalks, well above foliage.

Sentiment (raised and sent by Mr. J. F. Barwise). **H.C.** September 18, 1939.—3½ feet. Flowers 3½ inches diameter; rose bengal (H.C.C. 25/1), tips (H.C.C. 25/2); free and erect, on 6- to 12-inch stalks, well above foliage.

Tip (raised and sent by Messrs. K. Maarse of Aalsmeer, Holland). **H.C.** August 28, 1939.—3½ feet. Flowers 3½ to 4 inches diameter; a softer shade of sulphur-yellow (H.C.C. 1/1); very free and erect, on 6- to 9-inch stalks, well above foliage.

Vondel (raised and sent by Messrs. D. Bruidegom). **H.C.** August 28, 1939.—5 feet. Flowers 3½ to 4 inches diameter; tips of florets azalea-pink (H.C.C. 618), remainder orange (H.C.C. 12/1); free and erect, on 8- to 12-inch stalks, well above foliage.

The following varieties have been discarded:

DERWENTWATER, **H.C.** 1934
FRED WINDIBANK
KELMSCOTT
LITTLE LOVE, **H.C.** 1935
MME. MAURICE DE WULF
MARKET JEWEL
OUR BABY
YELLOW BABY

Cactus.

John Woolman (raised and sent by Messrs. J. Stredwick). **A.M.** August 28, 1939.—6 feet. Flowers 7 inches diameter; tips of florets scarlet (H.C.C. 19/2) shading to H.C.C. 19 at their base; free and erect, on 9- to 12-inch stalks, well above foliage.

The following varieties have been retained for future judgment:

DOMINANT (Bruidegom)
REBELLION (Stredwick)

The following variety has been discarded:

NIGHTFALL

GARDEN NOTES.

The Cultivation of Lilies in Tubs at Mount Clare, Roehampton.—The growing of Lilies in tubs, provided they are well looked after, offers a good alternative where the natural soil conditions in the open garden promise little hope for their success.

A great deal of expense and labour is frequently expended in endeavouring to grow even some of the easiest varieties in the garden, only to end in disappointment. It is some years now since I first grew Lilies in tubs, starting with *Lilium candidum* and *L. tigrinum* followed by *L. testaceum*, *L. regale* and *L. speciosum*. Often they were grown with success in small tubs measuring about 12 by 10 inches. For beauty and effect I have not found anything to equal *L. regale.* This Lily is considered a very easy doer, but from my own experience I have had better results in tubs than in the open garden.

The plants in the photograph (fig. 126) were planted 16 bulbs to a tub in December 1936. The tubs measure 22 inches in diameter and are 16 inches deep. Ten large holes are bored in the bottom for good drainage, which is most essential. For drainage I use old clinkers to a material depth of about 4 inches. The compost is a mixture of 1 part roughly chopped up loam, ½ part rough leaf mould, and ½ part silver sand. In the second year they were fed weekly, from the time growth was about 18 inches high, with farmyard manure water, till the flowers started to open. After flowering they receive the same treatment until the stems decay.

During the winter a little of the old soil is removed and replaced with a good dressing of sifted leaf mould. The tubs are left fully exposed for the winter rains to supply the needed moisture.

I have counted over fifty stems in some tubs this year, and the flower stems range from 4 to 6 feet in height—some stems carrying over thirty perfect flowers.

Should the temperature drop below 40° by 9 P.M. in May, sheets of brown paper are laid over the buds, on bamboo supports, to ward off frost.—*L. Prior.*

Delphinium Wellbyi.—Although not a hardy plant in the colder parts of Britain this is one of the most attractive species of Delphinium by reason of the graceful inflorescence which displays each blossom to the full, their delicate colouring and fragrance, and finally, but by no means least in importance, the length of its flowering season in late summer and early autumn.

The photograph (fig. 127) was taken at Mr. N. G. Hadden's garden at Porlock, Somerset, in the latter part of September and shows an established group flourishing in a rather shady position. At Wisley it is grown in the Half-hardy house, reaching a height of about three feet and flowering continuously for five or six weeks. It has been tried out of doors there in a sheltered border, but although surviving one winter (1937) it did not appear after that of 1938–39.

This species was described by Hemsley in the Kew Bulletin in 1907, from specimens collected by Captain Wellby in 1898 between Harar and Addis Ababa, Abyssinia, but I believe that its range extends to Kenya and east African highlands. The leaves are few and inconspicuous, borne on the lower parts of the flowering stems on long petioles, which, like the veins beneath the leaf, as well as its margin and upper side, are covered with soft hairs. The flowers are produced in a loose and much-branched inflorescence which needs careful staking to hold it upright ; the stems are wiry and slender but not always sufficiently strong, at least under glass, to maintain the flowers erect. The most noticeable feature of these is the long spur curving upwards, 1½ inch or a little more in length, which Hemsley stated was as long as any known in Delphiniums at that time. The Colour of this part is Bishop's Violet (H.C.C. 34/3), whereas that of the open flower is Cobalt Blue (H.C.C. 44/2) or Spectrum Blue (H.C.C. 45/2). The expanded flowers are 1½ to 2 inches wide and possess a tuft of dark anthers in their heart. Seeds offer the simplest means of increasing stock, but careful watch needs to be kept for ripening fruits which become mature before the later flowers have opened and thereafter are formed in constant succession. If ripened under glass the earliest may be sown forthwith in a cool house or frame, those produced later being kept until early in the following spring and then given the benefit of a little warmth to encourage early germination.—*B. O. Mulligan, Wisley.*

BOOK REVIEWS.

" Agriculture in the Twentieth Century." Essays on Research, Practice, and Organization, to be presented to Sir Daniel Hall. 433 pp. and portrait-frontispiece. (Oxford, Clarendon Press, 1939.) 15*s*.

This book is a series of fifteen essays offered to Sir Daniel Hall, K.C.B., F.R.S., as a tribute to his work and to himself, by a small group of his friends, colleagues and disciples. To Fellows of this Society Sir Daniel needs no introduction; for several years he has served on the Council and more recently has been elected Vice-President. He has taken the keenest interest in all aspects of the Society's work, and many visitors to our Shows will have admired and profited from the numerous interesting exhibits staged by the John Innes Horticultural Institution of which Sir Daniel has been Director during the last thirteen years, from which office he contemplates retiring shortly. His particular interest in the species of tulips, and also his book on apples, must be known to all readers of this JOURNAL, who will take up this volume wishing to share in the tribute so offered.

The first essay, by H. E. Dale, outlines briefly the relationship between the civil service, the executive concerned with the administration of British agriculture, and the industry. Sir Daniel Hall has been associated with this work since the last war, when he was appointed Technical Adviser to the Board of Agriculture. He was also intimately concerned with the Development Commission from its earliest days. This body has been largely responsible for the creation and expansion of many of our research institutions dealing with agricultural and horticultural problems. The author of this essay holds the opinion that by increased public control, at least partially exercised by civil servants, it may be possible to stabilize agricultural prices in future. We are given a glimpse of our bureaucratic machinery in smooth operation. The relationship of agriculture to the State is further considered by Dr. Venn, who in scholarly manner reviews the periods of depression from which the industry has suffered during the last century, and he contrasts and compares the troubles experienced after the Napoleonic and Great Wars. He contends that the State grants and financial aids, amounting now to some 2 per cent. of our budget expenditure, while greatly assisting the industry, have not entirely helped the producer to bridge the gap between the increased cost of production, mainly due to higher wages, and the greater returns received through higher prices. This essay contains a brief outline of a planned agricultural policy in which controlled marketing plays a prominent part, as it does to-day. Similarly, Professor Ashby's essay deals with agricultural conditions and policy in the period 1910 to the present time, and marketing schemes are again brought under critical review. No doubt in such a book it is impossible to avoid some repetition as regards subject matter, but the approach and argument differ. Mr. Orwin's analysis of the farmer's business and its cash margin affords an introduction to the study by the agricultural economists of the relative efficiency of large and small farm units as producers and profit- (or loss-) making enterprises.

The growth of the agricultural educational system, linked as it is with county and college instruction and advisory work throughout the provinces, owes much to Sir Daniel Hall for the foresight he displayed in initiating aspects of, and fostering this development. Professor Hanley reviews this subject in his essay.

Professor Scott Watson, in a well-balanced but shorter essay, shows how science and judgment must be combined by the producer or grower for the successful execution of his business, and he contends that the art of husbandry still centres around the tillage of the soil to produce a fine tilth. Sir John Russell, who succeeded Sir Daniel Hall at Rothamsted as Director, has reviewed the progress made in soil science from 1894 to 1938. His essay is more scientific and will appeal to all growers of plants whose interest in the soil will be further stimulated. Of particular interest is Sir George Stapledon's essay on grassland in its relationship to the plough and the " energy " that may be released by taking an arable crop, or cashing the value of the stored fertility, a subject of which more will be heard during these coming months. Dr. Hunter writes on plant breeding, mentioning the history of several of our well-known agricultural crop varieties, and describes some of the work under progress at the plant-breeding stations.

Dr. Salaman contributes an essay on the outlines of the history of plant-virus research, which forms a pattern beautifully woven from the threads of

FIG. 126 – LILIES IN TUBS AT ROEHAMPTON

[*To face p.* 536.

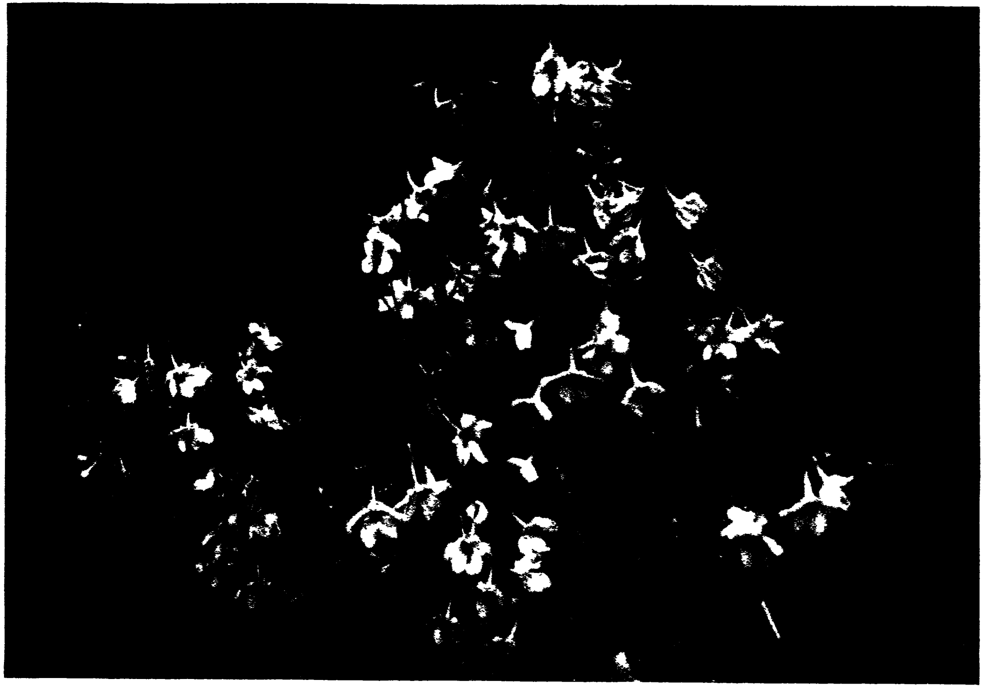

Fig. 127.—Delphinium Wellbyi

Fig 128.—Astragalus Durhami at Wisley

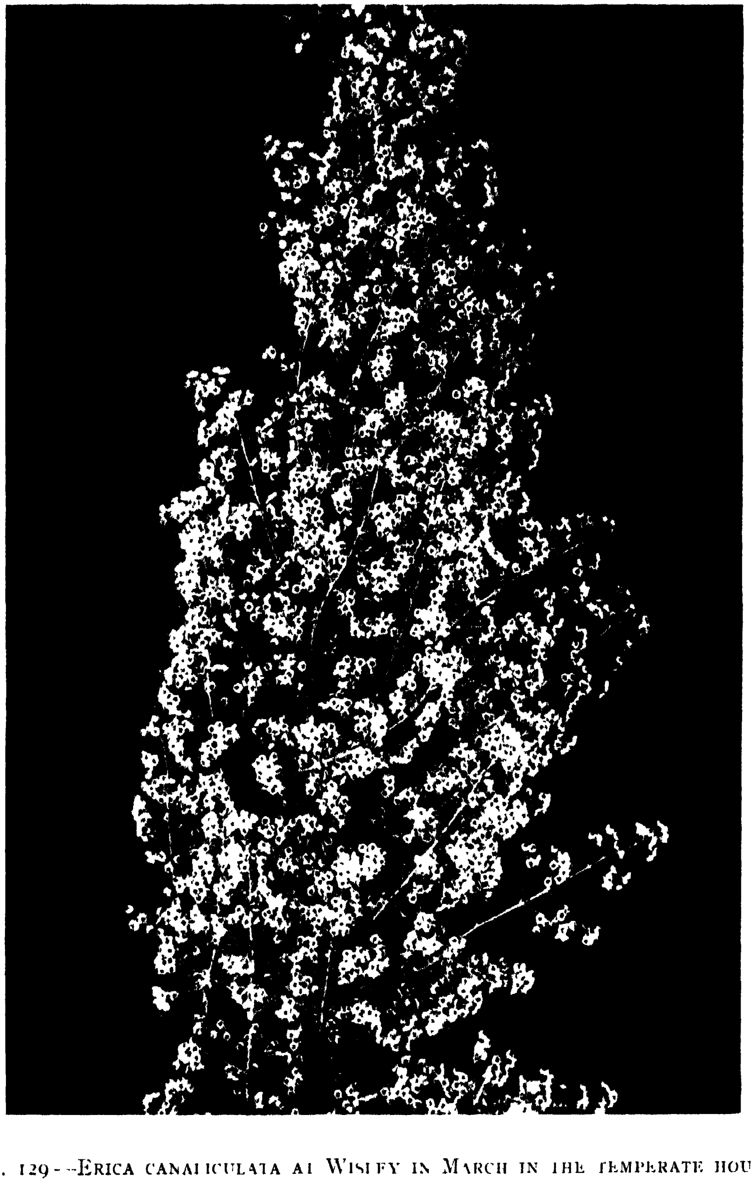

FIG. 129—ERICA CANALICULATA AT WISLEY IN MARCH IN THE TEMPERATE HOUSE.

scientific research on to the background of practical experience. It traces the progress of the investigations of these so-called plant diseases of great economic importance up to the present time with the isolation of crystalline nucleo-proteins which has raised questions concerning the borderline between living and non-living material. The authoritative essay by Mr. Fryer deals with plant protection and agricultural entomology and mycology. He shows how from small beginnings this valuable service has been built up; the chief features of the administration of the orders against destructive insect and fungal attacks are outlined. Horticulturists will find here much of direct interest concerning the pests of garden plants.

Dr. Hatton reviews the progress in scientific fruit growing, made chiefly through the activities of the East Malling and Long Ashton Research Station, the Low Temperature Research Station and Ditton Laboratory. His essay forms an excellent introduction to the recent work carried out at these Institutions, much of which will be already known to keen fruit growers.

Sir John Orr considers that the Government so far has done more to relieve the plight of agriculture than to reduce malnutrition due to poverty, although the plight of agriculture has not been over emphasized. " The time has come to consider the production and consumption of food as different aspects of one problem."

Other essays are not perhaps so closely concerned with horticulture, but undoubtedly deal with topics of the greatest importance to our health and happiness. Problems of animal nutrition, of milk production and national health are discussed. This series of essays by leading men of our time is undoubtedly a worthy tribute to be presented to Sir Daniel Hall, whose portrait forms the frontispiece.

M. A. H. TINCKER.

" Fruit Growing. Modern Cultural Methods." Edited by N. B. Bagenal, B.A. 8vo. 399 pp. Ill. (Ward Lock, London, 1939.) 21s.

Few things are more striking in horticulture than the remarkable progress that fruit culture, and especially the commercial side, has made in the past thirty years.

Much of this has been due to the example set us by other countries, in packing methods particularly, and to the establishment in this country of Research and Trial stations. In a short time the investigations carried out in this country have been accepted at home and abroad as of first-class importance.

Mr. Bagenal's book is an excellent condensation and summing up of our knowledge to-day in all branches of fruit growing and is designed both for the large growers and the amateur, a difficult task but one which has been accomplished as well as possible.

In his preface Mr. Bagenal states that he acts as Editor only and gives full acknowledgment to his published sources of information and the names of those specialists who have aided him.

The work entailed in mastering all this knowledge, weighing its value and distilling its essence for us has been great and the clearness with which the conclusions are set forth make it a book of the greatest value.

Readers, however, must not expect definite answers to all their questions, the factors are often too complex for that. How difficult it may be to answer what appears to be a simple question may be illustrated by the following cautious pronouncement on the question of stocks for Apples (p. 131):

" From the experimental point of view, it is not possible to say which of these two root stocks (' Broad-leaved Paradise ' and ' Doucin ') is better for commercial cordon plantations, or whether the ' Metz ' is a more suitable stock than either."

Such guarded words are annoying to the questioner who rejoices in clear dogmatic advice; but often it is not possible to reduce the complexities to a simple issue.

The arrangement of the book is excellent; after chapters on manuring, pruning, etc., in general, we shall find under each particular fruit its special needs in these ways, and very clear descriptions of pests and diseases, their treatment (dogmatism is in order here), and finally, a descriptive list of recommended varieties.

Fruit growing in frames and under glass is also treated.

The pruning directions are short and clear, though a few more illustrations would have been welcome, especially in the Peach section, but we realize that a full treatment of this would have unduly enlarged the work.

A very interesting point is made in classifying fruits according to their nitrogen and potassium requirements and the undesirability of interplanting them. Dessert Apples, Red Currants and Gooseberries are potash lovers. Cooking

Apples, Pears, Raspberries, Strawberries require potash also, but heavier dressings of nitrogen as do all stone fruits, so that separate plantings are advisable.

In a subject so large as fruit growing no two growers will agree on all points, and naturally the critic's voice must be heard even through his appreciation.

Let us take a few such points. In the list of varieties recommended, several are excellent old sorts but not now easily obtainable: such among Strawberries are Keen's Seedling and Waterloo.

For Pears under glass Beurré Giffard, Citron des Carmes, Doyenné d'Eté and Caillot Rosat are recommended, but, apart from the difficulty of finding the second and last, they would not be worth a place in any modern collection.

In the directions for gathering Pears no distinction is made between the early Pear, which must be gathered green, and the late one which will colour on the tree.

When the time comes for a new edition the historical notes might receive a little overhauling.

The statement that the Vine was introduced into England in 1552 (p. 237) is contradicted on the same page by a reference to its presence in monastic vineyards in the fourteenth and fifteenth centuries. Records exist, such as that of Canterbury, of vineyards in the twelfth century.

Pliny's account of the Cherry being introduced from Pontus has long been discredited; *a* Cherry perhaps, not *the* Cherry, a tree which grows wild over most parts of Europe.

The Peach, too, is not a Persian fruit but Chinese; Damsons may grow at Damascus, but they are also native to this country. The Chile Strawberry did not reach Europe at the same time as the Virginian but a century later. The Fig does not have its male and female flowers on separate trees but both are found in the same fruit though male flowers are rare.

These are small points which in no way detract from the book's practical usefulness and it can confidently be recommended to all fruit growers, large or small, as one of the best general books of reference on fruit cultivation that have been published in recent years.

We commend it specially to those Horticultural Societies who have a Library for general use. Nowhere can the questions which arise be more easily turned up nor more accurately answered.

"The Englishman's Food. Five Centuries of English Diet." By J. C. Drummond and Anne Wilbraham. 8vo. 574 pp. Ill. (Cape, London, 1939.) 12*s.* 6*d.* net.

There have been several books upon this subject, mostly of the anecdotal type, but this work is a serious review of English diet from the nutritional point of view and is thus very opportune.

The historical aspect is very fully treated and is of great importance. Most of the previous writings on this subject have been written to amuse and entertain, but dietetic history has many lessons of great importance for us to-day.

The history of man's taste in food is shot through with prejudice and superstition and is so even to-day. To this we must add a blind acceptance of authority which has led to many unexpected ends. Nothing can illustrate this point more forcibly than the remarkable aversion to fruit which began in Greek days and lasted for many centuries. According to the author it was Galen who started this prejudice and it was based upon the observation that his father, who lived to the age of a century, never ate fruit, therefore fruit was condemned for many hundred years.

The Medical Schools of Salerno emphasized this view and pointed out that summer fevers and troubles coincided with the season of ripe fruit. For many centuries therefore the doctors frowned upon raw fruit, and it was not until the eighteenth century that the Englishman, William Smith, proclaimed it a heresy and stated that ripe fruit was the most wholesome of all foods.

Vegetables, too, long suffered the disapproval of the doctors, and any examination of the food of the Middle Ages, and even down to Tudor days, shows how small a part they played in the national diet. Among their vices was noted the melancholy which followed their use and Burton, in his Anatomy of Melancholy, had much to say on this point. The addition of herbs of a cheerful nature, such as Pennyroyal, to counteract this disposition was probably the origin of our sauces, and to-day Sage, Salvia the healing plant, is the classic seasoning for Broad Beans.

The prejudice shown to new fruits and vegetables is well known; not long ago Tomatos were held to cause cancer, and the extraordinary reluctance of Southern England in growing the Potato is a classic example. Even Cobbett condemned " Ireland's lazy root " in his best invective style. While it had become the staple food of the Irish peasant by the end of the seventeenth century, as it was in Northern England in 1770, even the advocacy of Arthur Young and Coke of Norfolk took long to move the farmers and gardeners of Southern England to adopt its cultivation. Arthur Young, however, lived to see Potatos grown in the market gardens around London.

The remarkable increase in the consumption of fruit and vegetables in the past fifty years is well known and has played an important part in the improvement of the national health.

The authors discuss the value of canned fruit and vegetables and make an important statement which is worth quoting : " It is fair to say that the majority of canned fruit and vegetables on the market to-day are little inferior in nutritive value to the fresh product." The careful research initiated by the American canning factories has led to the remarkable result and the prejudice widely held against this product must be relinquished.

Running through the whole work is the question of vitamins, and many of the widespread diseases of olden days are very suggestively shown to be due to the lack of these accessory factors. The history of scurvy is well known, and now that some vitamins can be synthesized and obtained in crystallized form a great problem has been solved. The authors state that an Arctic expedition could be fully protected for a year by the provision of one ounce to a person.

The history of bread and the changes introduced in its character by the introduction of roller mills is of great importance, and it is curious to read that a " standard " bread, marked with an " S " containing a proportion of bran, was introduced in 1756, but the public would have none of it, white bread then, as unfortunately to-day, was demanded by all consumers. The comparison of " Brown " bread compared with white and wholemeal is remarkable, the Vitamin B content being : white bread, 5 ; ordinary " brown " bread, 15 ; wholemeal, 35.

The chapters on Institutional Dietetic Experiments, such as that at Christ's College, are fully discussed and in these days have an urgent interest.

Finally we have a chapter on Food Control in the Last War, a record and a warning.

It should be said that this book is addressed to the ordinary reader, the style is fluent and clear and any scientific terms and processes are explained in simple language. The proper study of mankind's food and its effect upon him will be better appreciated after a careful reading of this masterly work.

" Fundamentals of Fruit Production." Gardener, Bradford and Hooker. 8vo. 788 pp. Ill. (McGraw-Hill Publishing Co., New York, 1939.) 30*s*.

A second edition of this well-known work now appears and the additions of recent research have increased its size by about a hundred pages.

In it are collected so far as possible the records of research in fruit culture from all parts of the world, and at the end of each section a brave attempt has been made to sum up and harmonize these results.

The material now accumulated is immense and to put a right value on this widespread research seems beyond human powers.

The authors go far back into history and quote many of the opinions of a century ago, before some idea of precision in research in fruit culture came into being. Even our facts, often termed scientific, are hedged on every side by such qualifications as " in the years occupied by the experiment," or " under our conditions."

Each forward step in knowledge makes us more chary in generalizing ; every variety is a problem by itself in its reactions to soils, stocks and cultural treatment ; and the same might be said of every orchard or garden.

Such works as this are of the greatest value in presenting the fruit grower's problems as a whole and the research that they have inspired. With this broad outlook each grower will approach his own problems with enlightenment, but he will still have to solve them himself.

This, then, is a book for the specialist and he will welcome a new edition brought up to date.

" Three Acres and a Mill." By Robert Gathorne-Hardy. 8vo. Ill. (Dent, London, 1939.) 15*s*.

We have had many books in recent years written around the engaging theme of finding a country house and making a garden setting for it. One character they all possess is enthusiasm, and that alone gives them a wide appeal.

Mr. Gathorne-Hardy adds to this a knowledge of wild flowers at home and abroad which lifts his book out of the usual run. His rockery is for him an epitome of his travels, and starting from a rare Narcissus he goes on to tell the story of its finding in Northern Spain or elsewhere. Many will think that the chapters describing his plant-hunting are the best part of the book—but there are several interesting cultural points which arise and are discussed.

He is frank enough to give us the exact dimensions of his rock garden, a miniature compared with many, but he shows that interest does not depend upon size, and this book will encourage many novices to adventure into the cultivation of Alpine plants. Scenes of village life come in here and there and even a chapter on darts for the uninitiated, but there are enough horticultural pages to overshadow these deviations, and above all an infectious enthusiasm for Nature, wild and cultivated, which makes for readability.

"My Garden's Good-night." Compiled by Theo. A. Stephens. 8vo. Ill. (Published by My Garden, London, 1939.) 3*s.* 6*d.*

A gathering of poems and garden adventures from the periodical named above, with emphasis on the human rather than the horticultural aspect.

"Gardens in the Modern Landscape." By C. Tunnard. 8vo. 188 pp. Ill. (Architectural Press, London, 1938.) 15*s.*

The author believes that a new era is developing in landscape art. The best of the old and most perfect age of the eighteenth century is disappearing and there is need for the re-planning of the surroundings of the modern house, factory, shop and amusement centre in conformity with modern trends. He thinks there is need for a clear picture of what a garden should be and his aim is to sketch that picture.

Criticisms of old and modern methods in landscape gardening are found all through the book, but it is not destructive criticism so long as the reader sees eye to eye with the author in his statement of modern needs. Many will object to the geometrical designs that have been evolved in some gardens just as they will object to the stark lines of many modern structures that seem so often to lack the air of quiet comfort that many associate with the ideal home and which is carried out into the garden of the old cottage type where plants seem to be so much at home and in assured tenure of their positions. But all those who desire to have their minds stimulated in regard to the design of the surroundings of the house would do well to peruse this book and not hastily to discard the principles and ideas put forward therein.

"Imperial Bureau of Horticulture and Plantation Crops. Technical Communication No. 12: Plant Hormones and their Practical Importance in Horticulture." By Dr. H. L. Pearse. 88 pp. 4to. (East Malling, 1939.) 3*s.* 6*d.*

The Horticultural Bureau has provided a review of the recent experimental work dealing with the application of growth substances to horticulture. The primary value in practice of these substances lies in propagation, and much of the bulletin is taken up with this important aspect. Dr. Pearse has compiled a long tabular index which shows that 1,000 plants have given positive results when treated with various substances. This does not form a complete list but, as is indicated in this bulletin, merely shows typical results as examples.

Among the substances used indolylbutyric acid and α-naphthylacetic acid played a prominent part. The bulletin, however, does not mention certain compounds more recently found to be of use in this direction. Many readers would have found comparative reference to the treatments applied easier had all of them been expressed in a standardized manner.

In the text the author reviews the work of some thirty scientists who have tried with increasing success to apply these synthetic compounds to plant propagation. Dr. Pearse himself has observed that, by the additional use of Vitamin B_1, soft wood cuttings of deciduous fruit trees showed a tendency to grow more strongly after transplanting from the frames as the result of this vitamin treatment, but in general it has not been found possible always to obtain better results with very many plants in this way.

The bulletin also contains a useful section dealing with other effects of possible horticultural importance; here the influence on the general development of plants is briefly reviewed. It may be that in future there will be a practical application of these substances in the encouragement of development of fruits arising without normal pollination and fertilization.

This bulletin forms a useful summary of the work carried out up to date of its preparation.

M. A. H. TINCKER.

"Food from the Garden." Growmore Bulletin No. 1 of the Ministry of Agriculture and Fisheries. 8vo. 20 pp. (H.M. Stationery Office, London, 1939.) 3*d*. net.

With great promptitude the Ministry of Agriculture, in consultation with experts, has published this Bulletin, which answers many of the questions that gardeners will be asking themselves to-day.

How can I increase the food supply from my garden? What vegetables will be most valuable in war time? What is the best way to bring lawns and fields into productive use?

In the years which followed 1914 a great deal of energy was expended fruitlessly in planting unsuitable crops on poor soil and also in growing less valuable vegetables. This Bulletin will enable us to avoid these errors

The space that we can profitably cultivate will be limited by the amount of labour and fertilizers available. Our plans must be drawn on this basis, a large area under-manured will not be so profitable as a smaller one well prepared in every way.

A discussion of the different types of soils and manures required is given in a clear and simple manner in the Bulletin, with special emphasis on the need for decayed vegetable matter and the compost heap method of providing for this.

The best method of breaking up of grassland and its subsequent manuring is followed by a useful table of the quantities of fertilizers required for a proposed plot of ten rods, 30 × 90 feet. The rotation of crops on this standard plot is set out on a plan showing the number of rows for each kind and the distance for planting. The vegetables recommended are those which have been approved by dietetic experts, omitting those which may be termed luxury vegetables. Varieties are recommended in some instances but experienced growers will of course plant those which they have proved to be suitable for their conditions; the recommendations are mainly intended to guide those who come to vegetable growing without this knowledge. A table giving the amount of seed required for the suggested plot will be very useful to the beginner.

A useful page shows the months in which the various crops will be in use, and directions for controlling pests and vegetable storage and preservation conclude this very useful publication.

"Intensive Salad Production: including some Vegetables." By C. P. Quarrell. 8vo. 235 pp. Ill. (Lockwood, London, 1938.) 10*s*. 6*d*.

This is a very comprehensive account of methods used in England for the production of salads, an industry that has, during the past few years, and especially since the imposition of tariffs, made very considerable strides. It is easy to attempt to grow salads and to fail. Success comes only with competence, calls for knowledge, skill, and constant attention, as well as capital; and it also calls for prevision and adaptability. All this is clearly set out in the book under notice in understandable language, and methods are frequently illustrated by diagrams and reproductions of photographs. The latter too often appear to be edging off the page. Irrigation, soil-heating, methods of constructing protective devices, manuring, control of diseases, all come in for treatment.

All kinds of salad crops receive their due share of attention, and varieties for special purposes are listed.

"Flowers of the Desert: how to grow Cacti and other succulent Plants." By H. A. Day. 8vo. xii + 168 pp. Ill. (Methuen, London, 1938.) 5*s*.

The desire to grow succulent plants successfully is certainly increasing and there is now no lack of books provided to help the cultivator by advice as to methods and counsel as to the plants to choose. The number of succulent plants is prodigious and any book dealing with them must needs bristle with names. This is no exception and each name is accompanied by a brief description of the plant, and frequently by some remarks on its requirements where these differ from those laid down as generally necessary for the plants in the group being dealt with.

"Orangerien und Gewächshäuser: ihre geschichtliche Entwicklung in Deutschland." By A. Tschiva. 8vo. 136 pp. Ill. (Deutscher Kunstverlag, Berlin.) 8.50 M.

This well-printed and well-illustrated book deals with the construction of the Orangery and the Winter-garden that had so great a vogue in the eighteenth century. Examples are illustrated from German, French, Austrian and English sources. The book forms a valuable contribution to the history of growing plants under protection for the pleasure of seeing them, in countries where they could not grow without it, and an interesting introduction to the development of the modern conservatory, as well as a commentary on the architect's attempted adaptation of the grand style to the requirements of plants.

" Manuring of Fruit Crops." By T. Wallace. 8vo. 47 pp. Ill.
" Cider Apple Production." By B. T. P. Barker. 8vo. 75 pp. Ill.
" Commercial Apple Production." By J. Turnbull. 8vo. 56 pp. Ill.
(H.M. Stationery Office, London.) Paper Covers. 1*s.* 3*d.*, 1*s.* 6*d.*, and 1*s.* 6*d* respectively.

These three Bulletins, numbered respectively 107, 104, 111, contain a body of useful information for fruit-growers in this country based upon experience and experiment. They are indispensable for the would-be fruit-grower for the market and valuable even for the experienced. Perusal of their contents will answer many of the questions that inevitably arise from time to time and action guided by the facts here presented will often prevent great loss.

" The Owner-gardener's Handbook." By A. Mayo. 8vo. 165 pp. (Cobden Sanderson, London, 1938.) 3*s.* 6*d.*

This is a diary of operations in a mixed garden throughout the year. It tells what to do for vegetables and hardy flowers (with notes on indoor bulbs) and to some extent for fruits, but there is little about these. Many will find this little book useful as a reminder of things that must be done in each month of the year if the small garden is to be as pleasure-giving as it might.

" Grow them Indoors : Window Ledge and House Gardening." By A. H. Wood. 8vo. xiv + 186 pp. Ill. (Drummond, London, 1939.) 5*s.*

A guide to what can be grown in the dwelling-house and on the window-ledge is often asked for and though there are many continental books dealing with the subject there are few modern English ones. This book will therefore be welcome for its theme is just this—at least, we suppose it was written in England, though in his anxiety to avoid technical terms the author has apparently gone abroad for some of the " common names " of the plants and other things mentioned. That does not much matter. The important thing is to give clear directions for the treatment of the plants that are so often introduced into houses and there meet a premature death. The real seeker after knowledge as to how to kill scale insects will not be turned aside from finding kerosene emulsion, though kerosene is known by another name here, nor frightened off the lovely Marica because it is called a ' Toad ' Lily, which name is usually applied to Tricyrtis.

" Twentieth Century Gardening." By Charles Eley. Ed. 2. xvi + 296 pp. Ill. (Country Life, London, 1939.) 12*s.* 6*d.*

Those who have read the first edition of this excellent book will not need to be told that this revised edition with its added notes and the chapter on School Gardening, by Mr. G. K. Johnstone, well merits their attention. Those who have not should lose no time in securing this, its successor, for it is a book full of wise advice and clear directions on garden making and on the plants that should find a place in gardens under present-day conditions. Trees and shrubs naturally come in for great attention for after all they form the distinctive feature of the garden of the twentieth century. There is more variety than our fathers had—much more—and they are better understood and valued. It is quite possible to make a garden cheerful, colourful and beautiful at all times of the year by the use of shrubs and trees and grass alone, as many now know, and this book has done not a little to bring that knowledge home to many in the recent past.

" Fruit Juices and Related Products." By V. L. S. Charley and T. H. J Harrison. 4to. 104 pp. Ill. (Imp. Bur. Hort., East Malling, 1939.) Paper covers, 5*s.*

Fruit-juices have recently found a wide market as unfermented beverages with both thirst-quenching and curative properties.

The present bulletin is devoted mainly to the manufacture and value of apple-juice, the various processes in its manufacture being dealt with fully and different methods described and compared.

There are also chapters on other fruit juices, especially grape juice, citrus juice, soft-fruit juices (raspberry, black currant, strawberry and loganberry, with all of which, however, special difficulties have been encountered) ; on squashes ; cider ; various fruit wines and brandies ; cider vinegar. These are followed by an account of the concentration of fruit juices by the hot and by the freezing process, and of the preparation of apple pomace for various purposes, and finally by descriptions of methods of analysis.

" Practical Plant Breeding." By W. J. C. Lawrence. Ed. 2. 8vo. 155 pp. (Allen & Unwin, London, 1939.) 5*s*. 6*d*.

The first edition of this excellent little book was reviewed when it appeared in 1937 and we welcome the second edition. It is, as the sub-title expresses it, " A guide book for the enterprising gardener and horticulturist: a simple textbook for the student."

" Botany of the Living Plant." By F. O. Bower. Ed. 3. 8vo. xii + 700 pp. Ill. (Macmillan, London, 1939.) 15*s*.

This book has won, and justly won, an assured place among works on genera botany and we welcome a third edition bringing up to date the knowledge acquired during the last few years on various matters dealt with in the book. In revising it Prof. J. M. F. Drummond and Dr. G. Bond have both assisted in their particular subjects so that it well maintains its position as the standard work on botany in English.

NOTES AND ABSTRACTS.

Buddleia Fallowiana Balf. f. et W. W. Sm. By B. L. Burtt (*Bot. Mag.* t. 9564; July 1939).—A vigorous shrub from Yunnan attaining 6 feet or more in height, producing dense spike-like panicles of mauve flowers in late summer and autumn. Hardy in the milder parts of Great Britain.—*M. S.*

Chrysanthemum rubellum Sealy. By J. R. Sealy (*Bot. Mag.* t. 9566; July 1939).—The author reiterates his previous statement concerning this plant, that "it has every appearance of being a plant of garden origin such as might have arisen as a mutant from *Chrysanthemum Zawadskii* var. *sibirica*, or as a hybrid between that variety and some other chrysanthemum."

An excellent border plant forming large clumps and producing in the autumn many sweet-scented pink flowers. A hardy perennial of the Pyrethrum group known only in cultivation.—*M. S.*

Cyananthus macrocalyx Franchet. By F. Ballard (*Bot. Mag.* t. 9562; July 1939).—A low perennial about 3 inches high from East Tibet, Yunnan, and Szechwan, suitable for cultivation on a moraine. Related to *Cyananthus leiocalyx*, but distinguished by its sometimes yellow flowers with purplish streak on the outside of the corolla tube, its longer calyx, and its broader leaves.—*M. S.*

Fritillaria citrina Baker. By W. B. Turrill (*Bot. Mag.* t. 9560; July 1939).—Very near *Fritillaria dasyphylla* and perhaps not separable from that species. At present it appears to have slightly larger flowers and more numerous and narrower leaves.

A slender glaucous plant about 1 foot high, with yellow bell-shaped flowers greenish without. Native in S. Asia Minor.—*M. S.*

Jasminum dispersum Wall. By B. L. Burtt (*Bot. Mag.* t. 9567; July 1939).—A species with fragrant white flowers and dark green pinnate leaves, suitable for the cool greenhouse; closely allied to *Jasminum officinale* and *J. caudatum*, from which it can be distinguished by its shortly toothed calyx and its constantly pinnate leaves. Native in N. India from Chamba eastwards to Bhutan, Assam, and Yunnan in S.W. China.—*M. S.*

Lithospermum oleifolium Lapeyrouse. By J. R. Sealy (*Bot. Mag.* t. 9559; July 1939).—The plant here figured is considered a distinct form of the species figured at t. 8994 of the Botanical Magazine. It differs in its shorter calyx, longer corolla tube and shorter limb, and its exserted stamens. A dwarf prostrate shrub suitable for the alpine house, with many small deep sky-blue flowers. Native in Catalonia in rock crevices in the Pyrenees.—*M. S.*

Nomocharis Farreri (Evans) Harrow. By J. R. Sealy (*Bot. Mag.* t. 9557; July 1939).—A plant reaching about 3 feet in height carrying up to ten large soft pink flowers, the inner sepals crimson-spotted within, in a loose raceme. Native in north-east Upper Burma, and possibly in adjoining parts of Yunnan.

The differences between the species in the section Eunomocharis, to which this plant belongs, are discussed at some length, and a key is given.—*M. S.*

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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FORTHCOMING EVENTS.

THE close of the year is at hand and there is little of the Society's programme, curtailed as it was by the outbreak of hostilities, to draw attention to, but a few words on the proposed future activities of the Society will doubtless be acceptable.

AUTUMN SHOW.

The special Autumn Show held at the end of October, where autumn colouring, fruit and vegetables, predominated, was a great success, coming as it did after a stand-still period of several weeks. The support given by the trade exhibitors and by the Fellows themselves showed the advisability of maintaining the usual practice of the Society in holding Fortnightly Shows.

PROGRAMME, 1940.

A programme of Fortnightly Meetings and Shows, with lectures, has therefore been prepared for 1940, commencing on February 20, the date of the Annual Meeting of the Society.

It has not been possible to put all the details of lectures on the tickets owing to the shortness of time between their preparation and the date of issue, but further information will be published monthly in these pages.

It has been decided to maintain, as far as circumstances permit, all the other privileges of the Fellows: the Wisley Gardens and the demonstrations and trials; the Library and borrowing of books; the distribution of surplus seeds and plants (for application forms and lists, see the January JOURNAL); horticultural advice; examinations;

the JOURNAL and the preparation and issue of the various publications in hand.

SUBSCRIPTIONS, 1940.

Now, the success of this programme depends on the continued support of the Fellows and Associates, and they are reminded that their subscription to the Society falls due on January 1, and any changes in personal or bankers' addresses are particularly asked for, so that tickets and JOURNALS may be forwarded punctually.

DEMONSTRATIONS.

On December 6 and 7 (2 to 4 P.M.), weather permitting, there will be a demonstration at Wisley on the Pruning of Fruit Trees.

On January 11 and 12 (11 A.M. to 1 P.M.), weather permitting, there will be a demonstration at Wisley on the Treatment of Soil—Digging and Trenching.

The Director of the Gardens will be glad to know at an early date of those desiring to attend these demonstrations.

EXAMINATIONS.

The closing date for entries for the Teachers' Examinations is December 20, 1939, and for the General Examinations, January 15, 1940.

COUNCIL: EDITORSHIP OF THE SOCIETY'S PUBLICATIONS.

Dr. H. V. Taylor, O.B.E., V.M.H., Commissioner of Horticulture to the Ministry of Agriculture and Fisheries, has been appointed to fill the vacancy on the Council caused by the resignation of the late Mr. E. A. Bunyard who, prior to his regrettable death, had taken over the offices of editor of the Society's Publications and Keeper of the Library. Sir Daniel Hall, K.C.B., F.R.S., has been appointed to fill these posts with Mr. R. E. Hay as Associate Editor.

PUBLICATIONS.

The R.H.S. Diary is now available and Fellows are reminded that the calendar portion of the shows was printed prior to the outbreak of hostilities, and the publishers could not cancel this portion of the Diary except at considerable expense.

It is suggested that the following books, besides the Diary, might be considered as desirable Christmas gifts:—

The Lily Year Book for 1939, 5*s.* in paper cover and 6*s.* in stiff cover. Illustrated and containing valuable information on Lilies and how to grow them.

The Daffodil Year Book for 1939, 5*s.* in paper cover and 6*s.* in stiff cover. Illustrated. Containing the account of the 1939 Daffodil Show, new varieties and cultural advice.

The Horticultural Colour Chart, Vol. I., containing 100 plates of full hues with varying tints and shades. The second volume is in the press and it is hoped it will be published early in the new year. The price of each volume to Fellows is 10s., plus 6*d*. postage, and to non-Fellows the price is one guinea, plus postage. The two volumes together will contain a complete range of colours, their hues, tints and shades suitable for horticultural as well as for many other purposes.

Some Good Garden Plants, 4*s*. paper cover. An illustrated record of some of the best plants for the garden with horticultural advice.

Ornamental Flowering Trees and Shrubs, 7*s*. 6*d*. plus postage to Fellows, and 10s. plus postage to non-Fellows. Containing illustrations and cultural notes of the more important flowering trees and shrubs for the garden.

A full list of the Society's publications may be had on application to the Secretary.

AFFILIATED SOCIETIES AND FOOD PRODUCTION.

Local horticultural societies will naturally wish to do all in their power to increase food production during the coming year. In order to assist the committees of affiliated societies to encourage their members in this national work, the Council is prepared to present to every affiliated society a Knightian Medal to be offered for award in 1940 to the member having the best cultivated garden or allotment. Particulars, together with a form of application, may be obtained from the Secretary.

WISLEY IN DECEMBER.

At the end of the year it is not to be expected that the Gardens can show a great display of colour, either indoors or outside, but those who do visit them will find some plants in both sections to remind them that no season of the year need be entirely without some ornamental plants in the garden.

To take the greenhouses first, there are in the Half-hardy House examples of the winter-flowering *Lithospermum rosmarinifolium* from Capri with its rich blue flowers, *Clematis cirrhosa* from southern Europe trained on one of the supports of the house, that almost perpetual-blooming hybrid *Abutilon* × *Milleri*, the latest *Nerines* with scarlet or pink heads and probably the earliest golden clusters opening on the shrubby *Cassia stipulacea*, another plant which has an exceedingly long season here.

The species of *Epacris*, notably *E. ardentissima* and *E. miniata*, form one of the chief decorative features of the Temperate House, with a profusion of either crimson or red-and-white tubular blossoms borne along the branches, but *Camellia japonica* var. *magnoliaeflora* with its shapely, delicate pink blooms, and the waxy trumpets of *Lapageria rosea* climbing on the west side of the house run them close for principal honours. In the same house also are the South African *Erica canaliculata*, which in mild climates may be grown outside; the red-flowered shrub *Cestrum Smithii*, and *Acacia alata* with broad-winged stems, the first of its family each year to come into flower in this house.

Few of the numerous plants in the Alpine House have any flowers now, except perhaps the delightful and useful but unfortunately tender *Aster Pappei* with bright blue Daisy heads, *Cyclamen ibericum* in glowing carmine or rosy-pink, the pink *Chrysanthemum Mawii* from the Atlas Mountains and the aptly-named *Iberis semperflorens* bearing white Candytuft heads of flowers.

The Rock-Garden may be enlivened by the white, pink-tipped buds of the large specimen *Erica lusitanica* growing in the lower part, which usually comes into flower in December, and pale-blue flowers are also to be found on *Vinca difformis* beside the path leading to the Alpine House. The latter is a native of Spain and northern Africa and like its congeners is an excellent plant for covering rather poor situations beneath trees. In the Wild Garden *Mahonia japonica* deserves mention for the fragrant yellow flowers produced in long pendulous racemes at this time of the year and into February or even March; this species is frequently grown and sold as *M. Bealei*—a Chinese plant which has short upright racemes and flowers later.

Only two shrubs, or rather small trees, are likely to be flowering in Seven Acres—the well-known *Prunus subhirtella* var. *autumnalis* which has one season now and another in early spring, and the hybrid *Arbutus andrachnoides*, worthy of a place for its rich brown stems and bark as well as for the winter flowers. However, colour is provided by the berries yet remaining on *Berberis*, *Cotoneasters* and other shrubs besides the variously toned stems of the Dogwoods (*Cornus*), *Stephanandra* species, Willows, Birches and some of the *Berberis* such as *B. virescens* and *B. Lecomtei* the young shoots of which are rich red. The value of these shrubs should not be overlooked when planting, nor that of the golden-variegated forms of *Elaeagnus pungens* and some of the Conifers, especially the Cupressus. *Viburnum fragrans* is another of the few shrubs which habitually flower at the end of the year, and specimens are to be seen both in the Award of Merit Garden and in the central clearing of the Wild Garden, 5 or 6 feet in height. Finally, beside the entrance gates we may confidently expect to find the mauve flowers of the Algerian *Iris unguicularis* (*I. stylosa*) pushing up from beside the south wall of the Laboratory—a plant which no one would dispense with who has once grown it for its invaluable succession of blooms for cutting.

THE VEGETABLE GARDEN IN DECEMBER.

It is perhaps fortunate, if anything about war could be so described, that the outbreak of hostilities happened at the season of preparation ; this has made it possible to increase the area available for the cultivation of vegetable crops without the loss, or partial loss, of a growing season. Most gardeners have already formed a plan of campaign, and sites for the increased planting of the important vegetables will have been selected with a view to their inclusion in some scheme of rotational cropping.

As indicated in the leaflet published by the Ministry of Agriculture and Fisheries, increased crops of vegetables that may be stored for winter use are of the greatest importance : Potatos, Carrots, Turnips, Beet, Shallots and Onions, with, of course, green vegetables for winter use, will thus form the main crops of the war-time vegetable grower. Of these, special attention must be paid to Carrots and Onions, as we have relied hitherto upon foreign supplies to a great extent.

During the month of December operations consist principally of the preparation of the ground ; digging one spade deep and incorporating the products of compost heaps, waste vegetable refuse or, where it is obtainable, stable manure. Very heavy land should be thrown up into ridges as digging proceeds, to allow the winter rains and frost to assist in the work of breaking it down into a good tilth. A dressing of lime will do much towards breaking up heavy clay soils ; and soils that are found to be deficient in lime, after testing them by one of the excellent soil-testing outfits now available, should receive a dressing of 20 to 25 lb. per rod.

Those who wish to hasten the growth of early salad and other vegetables either by the continuous cloche method or by the use of Dutch lights may save time later on by ordering these requisites now. Where facilities exist it would be time well spent to make a small number of Dutch lights, as these will, with careful use, repay their cost many times. Beds should be prepared in a sunny, sheltered part of the garden, and posts and boards placed in position to support the lights.

While the greatest care must be taken that no wastage of seeds or fertilizers is allowed to occur, there is no reason why the wise gardener should not take a few chances with the weather and endeavour to extend the season as far as possible both at the beginning and at the end of the year. A sowing of Broad Beans in a warm border in favourable districts made during December should, in many cases, prove satisfactory. The first sowing of Tomato seeds to provide plants for growing under glass may be made in a greenhouse during the month of December.

THE MOUTAN PAEONY.

By F. C. Stern, F.L.S.

The Tree Paeonies of the gardens of China have been famous among the Chinese since very early times. They have been surrounded by an air of romance and are still, even in the twentieth century, capable of romance, as this story will show.

The early missionaries to China sang the praises of their wonderful flowers which they called the 'Moutan' after the Chinese name 'Mou-tan-wha,' the Moutan flower. In the eighteenth century the pictures of Tree Paeonies, bushes with huge and beautiful flowers, were first seen in the Chinese paintings sent back to Europe. Stories were told how these flowers were closely guarded in the gardens of the Imperial Palace and in the gardens of the mandarins.

These tales excited the adventurous gardeners in England to try to obtain the plants of which they had heard so much. Sir Joseph Banks, who was always to the fore in trying to introduce new plants, engaged a Mr. Duncan, a medical man attached to the East India Company, about 1786, to procure a plant for the Royal Gardens at Kew. It was received at Kew in 1787. Sir Joseph Banks also planted a Tree Paeony at Spring Grove within ten miles of London about the same date, which in 1825 was said to be about 8 ft. high and about 10 ft. in diameter; it was named *Paeonia Moutan* var. *Banksia*. Sir Abraham Hume of Wormley Bury, Herts, also imported these plants; one of these was said to have grown into a huge bush by 1835 and to have borne 320 flowers!

Tree Paeonies became more common in the nineteenth century owing mainly to the work of Robert Fortune, who was sent to China by the Royal Horticultural Society in 1843. He went round the Tree Paeony nurseries in China and sent home plants which were propagated and distributed by the Society. But the wild habitat of the Tree Paeony was still unknown. In a Chinese work describing the province of Shensi, written about 1698, the Moutan was stated to grow in great profusion on a hill called Moutan Shan, colouring the whole hill red with blooms in spring and scenting the air around.

The travellers H. Scallan and G. Giraldi found the wild Tree Paeony in Shensi, but no seeds or plants or dried specimens were brought back. R. P. Licent and W. Purdom also found it in the same province; Purdom sent back seed and plants to Messrs. Veitch and also dried specimens in 1910. Most of the plants and seeds were lost, but there are still one or two plants growing at the Arnold Arboretum, Boston, U.S.A. This Paeony turned out to be a variety of the wild Tree Paeony, but is probably not the ancestor of the garden form. It was named by Alfred Rehder *P. suffruticosa* var. *spontanea*; it differed from the garden form by being smaller in all its parts, with the leaflets rather stunted and the teeth of the divided leaflets blunt instead of the leaflets being deeply divided with the teeth long and sharp. Other so-called wild forms were found by native collectors in the north of India and Tibet. These plants differ little from the garden forms and, in my opinion, are possibly escapes from monastery or lamasery gardens; the monks of China have a particular liking for Paeonies, and no doubt their brethren in Tibet and northern India have the same affection for this flower. It seems unlikely that stray specimens should be found such immense distances from the probable wild habitat of the Tree Paeony.

The ancestor of the garden Tree Paeony had still to be found wild, and it was the good fortune of that most enthusiastic of plant collectors, REGINALD FARRER, to see the wild Tree Paeony in all its glory. He found it in the province of Kansu in western China in 1913. In his book, On the Eaves of the World, he writes: " Through the foaming shallows of the copse I plunged and soon was holding my breath with growing excitement as I neared my goal and it became more and more certain that I was setting eyes on *Paeonia Moutan* as a wild plant . . . that single enormous blossom, waved and crimped into the boldest grace of line, of absolutely pure white, with feathering of deepest maroon radiating at the base of the petals from the boss of golden fluff at the flower's heart."

It is interesting to read further in his record of that day that " the breath of them went out upon the twilight as sweet as any Rose," which confirms the statement in the old Chinese work that the wild Paeonies scent the air around; this might have been thought to be poetic fancy as the flowers of Tree Paeonies have little or no scent in the gardens in England. Unfortunately, FARRER brought back no seeds, plants or dried specimens, so the wild Tree Paeony was yet to be introduced.

In 1925 Dr. J. F. ROCK was living at Choni in south-west Kansu; some time after that date he sent seeds of a Tree Paeony to the United States, which were distributed to growers in U.S.A., Canada, Sweden and Great Britain. It flowered in all these countries in 1938. One plant flowered in my garden at Highdown. The flowers seemed to tally exactly with the description given by FARRER of the wild plants he saw, so I wrote to Dr. ROCK, who was still in China, asking him if these seeds really had been collected from wild plants. He answered:

" The seeds of the Paeonia about which you enquire I collected from plants which grew in the Yamen of the Choni Lamasery (elevation 8,500 ft.), in S.W. Kansu. I occupied the Yamen in that Lamasery for about a year. In the court of the Yamen grew a very beautiful single-flowered Paeonia. There were no double-flowered ones, all were single. I remarked at the time that it looked to me like a wild species. The Lamas told me it came from Kansu but from which exact locality they did not know. I never came across it in a wild state. It had been kept for years in the Lamasery. I took a photo of it growing in the court and I enclose a copy with my compliments. The Lamasery has been entirely destroyed and the Lamas all killed in 1928 by the Mohammedans, so the plant, in all probability, does not exist any more, as the entire Lamasery was burnt to the ground."

The photograph of this Paeony growing in the Yamen court of K'ang-ting ssu (Lamasery) Choni (fig. 130), south-west Kansu, at an elevation of 8,500 ft., was taken by Dr. J. F. ROCK in 1925. It may be interesting to record that seeds of this Paeony kindly sent to me by Mr. K. MCDOUALL of Logan, were sent to Dr. ROCK in China to replace the plants destroyed in the Lamasery at Choni and were safely received by him, so let us hope the Paeony will again bloom in the Lamasery in years to come to bring peace and joy to the monks.

This Paeony is very like the plant which ANDREWS described and illustrated in the Botanical Repository, vol. vii, t. 463 (1807) as *P. papaveracea* and differs from it only in the colour of the sheath surrounding the carpels which ANDREWS describes as purple while in Dr. ROCK's plant it is white. Dr. ROCK's Paeony growing in my garden at Highdown is seen in fig. 131; it agrees with the two wild plants of the Tree Paeony *P. suffruticosa* collected by R. P. LICENT in south-west Kansu and by A. E. PRATT in Szechwan, of which dried specimens are in the Kew Herbarium.

So it would seem that at long last the true wild Tree Paeony has been introduced to the gardens of Europe and America, and as it has been so well distributed owing to the kindness of the authorities of the Arnold Arboretum, Boston, it will remain a permanent adornment to the gardens of the Western World.

ROMNEYAS.

By C. T. MUSGRAVE, V.M.H.

THE Californian Poppies will always be more at home in the south than in the north of England, and in a light sandy loam in a sunny position, protected from strong winds, they will flourish. Where they are happy they increase very rapidly, the roots running underground and sending up flowering stems many feet, and even yards, away from the main plant. It is therefore advisable to give them a bed to themselves, and it will be a wise precaution to arrange the bed where it can easily be enlarged to twice or even three times its original size so that the plants may have room to develop and to show themselves off.

The flowering stems may run up to 7 feet or more, and, except in the mildest parts of this country, these stems will die back in winter. In severe weather a mulch of leaves, leaf mould or peat moss litter will be beneficial to protect the crowns of the plants.

There are only two known species of Romneya: *R. Coulteri* and *R. trichocalyx*. A hybrid has been raised between the two species, and

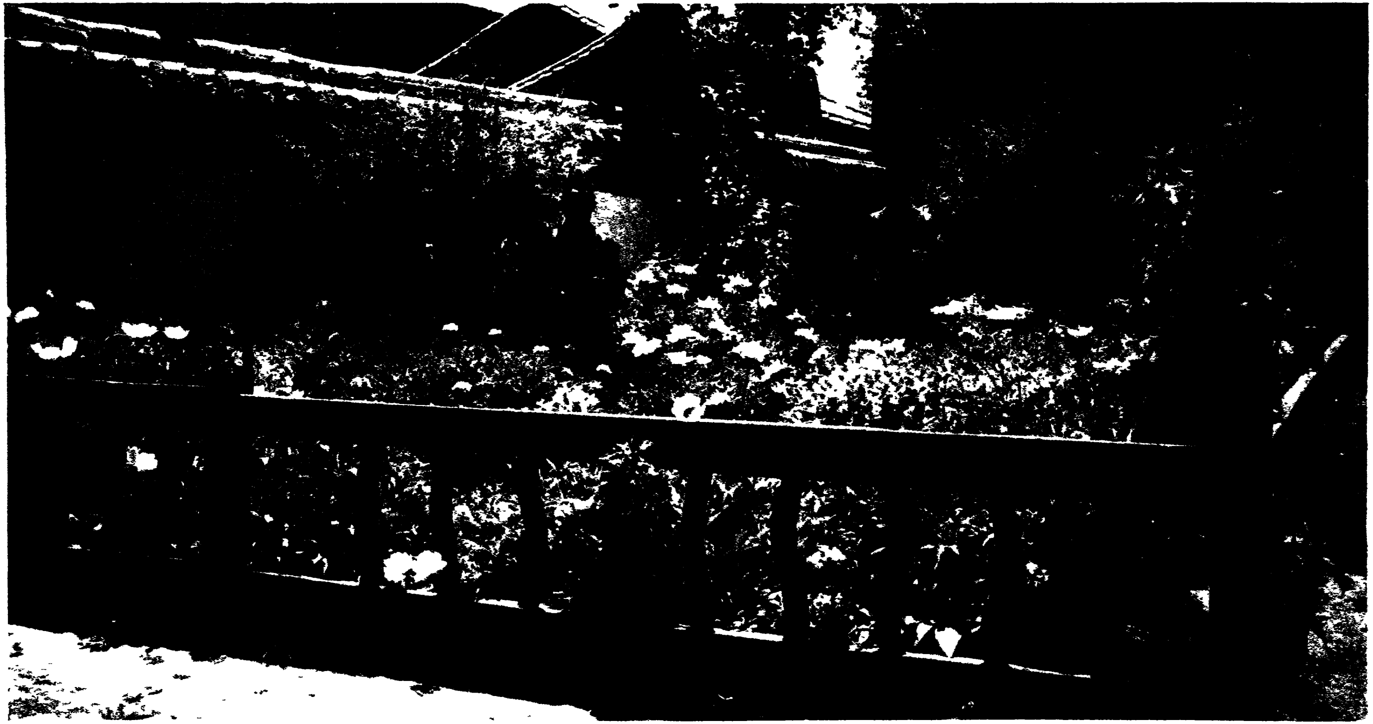


FIG. 130.—THE MOUTAN PAEONY IN THE COURT OF THE YAMEN OF THE CHONI LAMASERY

[*To face p* 552.

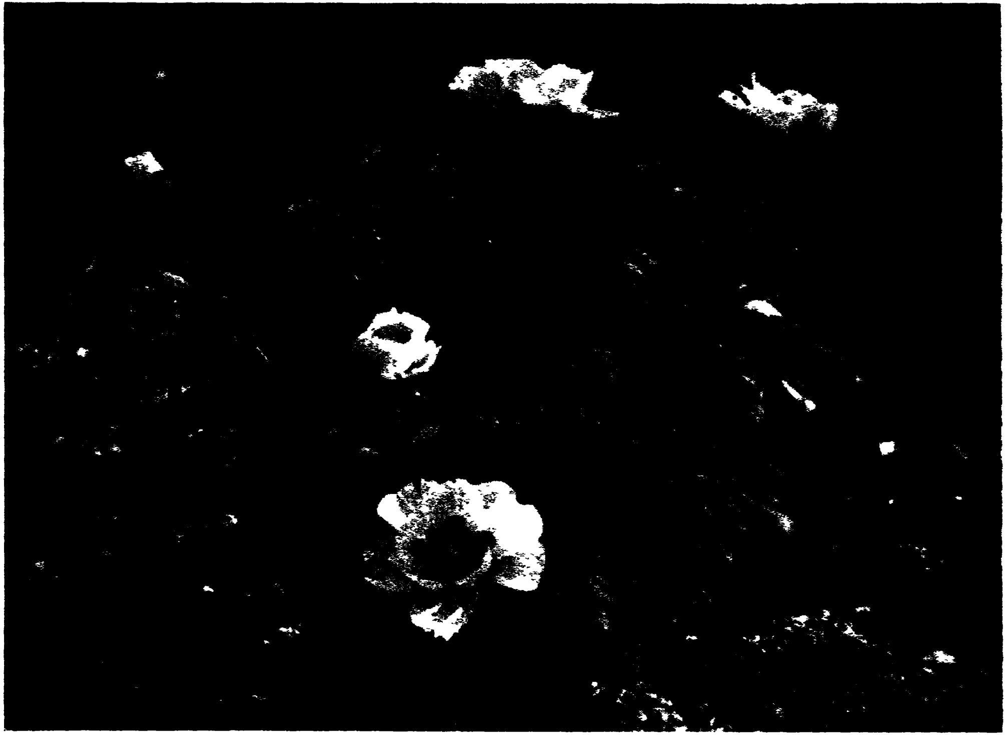


Fig 131 —Dr J F Rock s Paeony growing at Highdown
(see p 552)

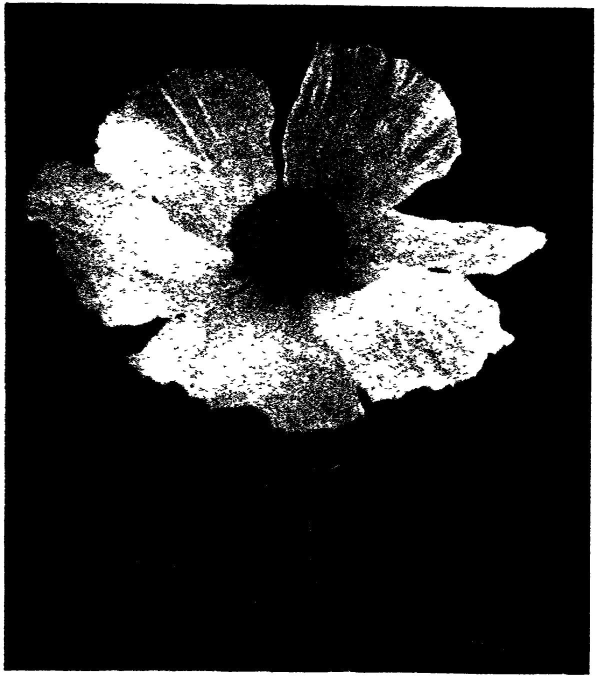


Fig. 132.—Romneya trichocalyx.

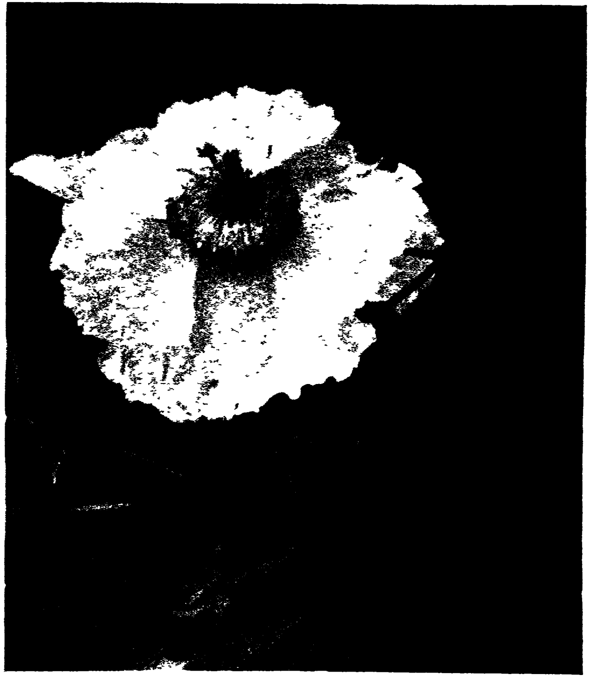
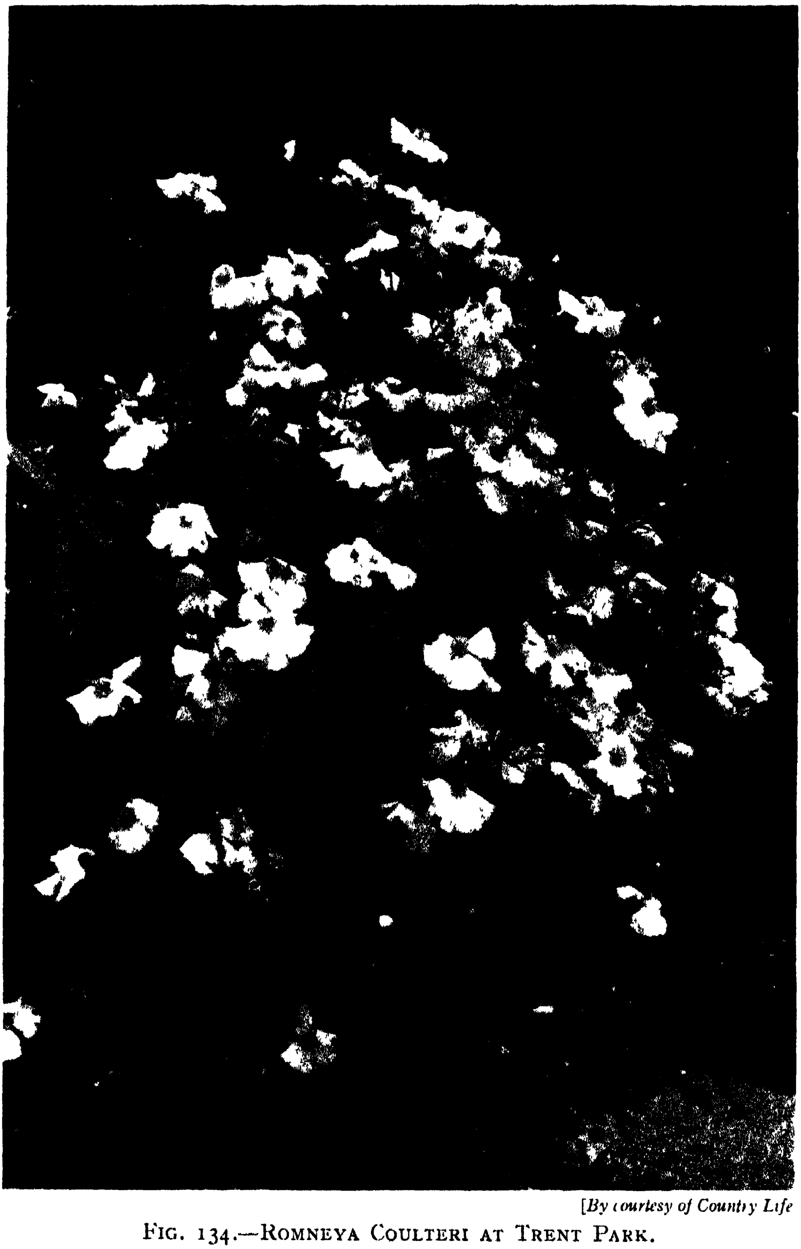


Fig. 133.—Romneya Coulteri.

(see p. 552)



[By courtesy of Country Life

FIG. 134.—ROMNEYA COULTERI AT TRENT PARK.

it is probably a commoner plant than either of the species. All the three plants are very similar in appearance and at a distance it is not easy to distinguish between them. A closer inspection, however, shows that the three sepals enclosing the flower-bud of *R. Coulteri* are quite smooth, while in the case of *R. trichocalyx* the sepals are covered with stiff rough hairs or bristles. This feature is well shown in the figure of *R. trichocalyx* in the Botanical Magazine t. 8002.

The gardener will find other means of telling the difference between the two plants which may not be sufficient to justify a botanical distinction. For instance, the general colouring of the leaves of *R. trichocalyx* is a bluish grey-green and its flowers have a most disagreeable smell. On the other hand the general colouring of the leaves of *R. Coulteri* is green, and the flowers are deliciously scented. They have been described as having the aroma of a bottle of fine old hock. Again, anyone who has grown the two plants for many years can tell the difference between their flowers at once and with certainty. The big white petals of *R. trichocalyx* look as if they were pleated or fluted from their outer edge towards the centre of the flower (fig. 132), while the petals of *R. Coulteri* look like pieces of white tissue paper which have been crumpled up and then unfolded leaving the crinkles clearly visible even when the flower is fully open (fig. 133).

The hybrid is not known to have any varietal name ; its flowers take after *R. trichocalyx* rather than *R. Coulteri* and they have no scent.

The Romneyas may be propagated by root cuttings or by cuttings of pieces of the underground stems which have an eye or bud. They may also be propagated by seeds if these can be obtained, but it is doubtful if either of the two species naturally sets seeds in this country. If the flowers of either one or other of the two species are hand-pollinated there is a chance that seeds may be produced. But if the pollen of *R. trichocalyx*, which is very plentiful, is artificially conveyed to the stigma of a flower of *R. Coulteri*, seeds will probably be freely produced. Curiously enough pollination does not appear to be effected by bees or wind even when *R. trichocalyx* and *R. Coulteri* are planted side by side in the same bed.

All the three Romneyas flower in late July, August and September, and in a warm sunny year established plants form a beautiful picture against a dark background with their big white flowers which are often 5 or 6 inches across. *R. Coulteri* should always be planted if it is available, because of its scent. Fig. 134 shows a splendid clump of *R. Coulteri*, about forty years old, at Trent Park, Barnet.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXXXVIII.—A FURTHER REPORT ON ROOT-FORMING SUBSTANCES USED FOR PROPAGATION PURPOSES.

By M. A. H. Tincker, M.A., D.Sc., F.L.S., assisted by C. H. Unwin.

Introduction.

Two accounts of the experiments carried out with growth substances in propagation have appeared in Journal R.H.S., Vol. 61, p. 510, and 63, p. 210. Since then many more plants have been tested, paying particular attention to those known to offer some difficulty to propagators. Other synthetical compounds, and proprietary substances recently marketed in this country and abroad have now been tested and are here discussed.

A review of the results obtained by using these substances in this and other countries was prepared for the Twelfth International Congress of Horticulture, Berlin, 1938, and it is not intended to discuss this work in this paper. Mention will be made only of certain points of interest that directly concern the Wisley results. Plants previously reported to have been propagated successfully are not again cited, except where fresh information is available.

Methods of Application.—The lanolin paste method of application of the active substance has been superseded by the use of solutions into which the cuttings are placed. Pure chemicals have been largely used in these tests ; proprietary substances have also been tested, but are referred to by the name of the active content where that is declared by the manufacturers. Proprietary substances of a secret formula are referred to here by letter only. Solutions are now being challenged by powders : talc frequently carries the active chemical, the ingredient being named by some manufacturers. The cuttings are dipped into the powder at the base of the stem and sufficient adheres. A steady but low concentration of the substance will be maintained for some little time as the soluble part of the powder dissolves. This proves to be sufficient for stimulation of the cells of the cutting. The method is simple and the trouble of dilution of solutions is avoided.

Technique.—Control cuttings were placed directly into the sand on severance from the plant, or stood with their stems in distilled water for the same time as treated cuttings were left in the stated solutions. Usually 50 or 100 cuttings or more constituted a series, except where the scarcity of the material prevented such procedure. Pure sand was used for insertion of the cuttings and was frequently changed ; the frames were unheated but were placed in a cool greenhouse. For certain hardy plants cold frames in the open were used and a limited number of hard-wood cuttings were placed under cloches or bell glasses in the open. The frames were watered daily and shaded during hot weather; if necessary a further light watering was given in the late afternoon. Rooted cuttings were transferred to small pots which were kept in a frame with relatively high moisture for several days; the young plants were then transferred to open conditions.

TABLE I.

Range of concentrations, and time of uptake of solutions.

1. $\frac{1}{10000}$ for 24 hours.
2. $\frac{1}{10000}$,, 48 ,,
3. $\frac{1}{20000}$,, 24 ,,
4. $\frac{1}{20000}$,, 48 ,,
5. $\frac{1}{30000}$,, 24 ,,
6. $\frac{1}{30000}$,, 48 ,,
7. $\frac{1}{30000}$,, 72 ,,

P4, P6, $\frac{1}{5000}$.

8. $\frac{1}{40000}$ for 24 hours.
9. $\frac{1}{50000}$,, 24 ,,
10. $\frac{1}{50000}$,, 48 ,,
11. $\frac{1}{60000}$,, 24 ,,
12. $\frac{1}{60000}$,, 48 ,,
13. $\frac{1}{60000}$,, 72 ,,
14. $\frac{1}{100000}$,, 24 ,,

P5, $\frac{1}{3000}$ (talc).

P1, P2, P3, concentration not disclosed by makers.

TABLE II.

Substances used in the solutions and powders.

A.	3-Indolylacetic acid.
B.	γ-3-Indolylbutyric acid.
C.	α-Naphthylacetic acid.
D.	3 : 4-Dihydro-1-naphthylacetic acid.
E.	1 : 2 : 3 : 4-Tetrahydro-1-naphthylacetic acid.
F.	1 : 2 : 3 : 4-Tetrahydronaphthylidene-1-acetic acid; m.p. 92° C. = "A."
G.	,, ,, ,, ,, ; m.p. 163° C. = "B."
H.	Sodium-tetralolacetate.
J.	Mixed acids [approx. 70% D; 20% F; 10% G].
P1.	Powder containing A. (See Table I.)
P2.	,, ,, B. ,, ,, ,,
P3.	,, ,, C. ,, ,, ,,
P4.	,, ,, F.
P5.	,, ,, J.
P6.	,, ,, C and J.
X.	Proprietary substance contents not fully disclosed.
Y.	,, ,, ,, ,, ,, ,,
Z.	,, ,, ,, ,, ,, ,,

* Indicates sodium salt used shown by small letter.

TABLE III. RESULTS WITH READILY PROPAGATED PLANTS.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Asystasia bella. . . .	August	B8, J8, P4, P5, P6, Y	With all treatments more cuttings rooted in 21 days. Better root system.
Buddleia alternifolia .	June	B5, C5, F5	80 per cent. more cuttings rooted in 5 weeks.
		G5, P5	10 per cent. more cuttings rooted in 5 weeks.
	September	P1, P2, X5, P4, P5, P6	35 per cent. more cuttings rooted in 3 weeks.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Calceolaria violacea	May	B8, H8	45 per cent. more cuttings rooted in 6 weeks.
		J8, Z	30 per cent. more cuttings rooted in 6 weeks. All had better root systems.
Ceanothus thyrsiflorus	October	A5	10 per cent. more cuttings rooted in 4 weeks.
		F5, X	60 per cent. more cuttings rooted in 3 weeks.
Clematis vedrariensis var. *rosea*	June	B5, C5	75 per cent. more cuttings rooted in 3 weeks.
Cyathodes robusta	August	A5	Slight acceleration over control.
Delphinium hybrid	March	B10	60 per cent. more cuttings rooted in 3 weeks.
Dianthus Caryophyllus	May		
hybrid flowering shoots		C3	60 per cent. more cuttings rooted in 4 weeks.
lateral branches		C3	20 per cent. more cuttings rooted in 4 weeks.
Diervilla hybrid	June	J5, H5, j5*	With all treatments 40 per cent. more cuttings rooted in 4 weeks
Dimorphotheca Ecklonis	October	X3	33 per cent. more cuttings rooted in 17 days.
Dipelta floribunda var. *parviflora*	June	J5	85 per cent. more cuttings rooted in 4 weeks.
		f5, j5	70 per cent. more cuttings rooted in 4 weeks.
		B5, C5, F5	60 per cent. more cuttings rooted in 4 weeks.
		G5, H5, g5	10 per cent. more cuttings rooted in 4 weeks.
Forsythia Giraldiana	June	B5, G5	30 per cent. more cuttings rooted in 6 weeks.
Fuchsia hybrid	September	C8	40 per cent. more cuttings rooted in 3 weeks.
Fuchsia Riccartoni	September	B5, E5, X	Stronger root systems.
Grevillea rosmarinifolia	March	B5, f5	80 per cent. more cuttings rooted in 7 weeks.
		g5	25 per cent. more cuttings rooted in 7 weeks.
	June	A3, C3	35 per cent. more cuttings rooted in 7 weeks.
Heuchera tiarelloides var. *alba*	June	B5	100 per cent. more cuttings rooted in 14 days.
Libonia floribunda	June	B3, C3	All rooted 100 per cent. in 21 days, but treated gave better root results.
Myrtus communis var. *tarentina*	October	A5, B5	90 per cent. more cuttings rooted in 4 weeks.
Nuttallia cerasiformis	April	F5, X	20 per cent. more cuttings rooted in 4 weeks.
Olearia Gunniana	September	B8, C5	25 per cent. more cuttings rooted in 4 weeks.
		C8, Y	55 per cent. more cuttings rooted in 4 weeks.
	September	P1, P2	35 per cent. more cuttings rooted in 4 weeks.
Oxalis tuberosa	April	B9	100 per cent. rooted in 18 days.
Philadelphus Lemoinei var. *Girandole*	July	C3	80 per cent. more cuttings rooted in 4 weeks.
Rosa Banksiae	August	A14, B14	15 per cent. more cuttings rooted in 21 days. 100 per cent. rooted.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Sarcococca Hookeriana	May	A3, C3, F3, f3, J3	30 per cent. more cuttings rooted in 6 weeks.
Sycopsis sinensis	January	F7, G7	45 per cent. more cuttings rooted in 9 weeks.
Viburnum fragrans	May	B5, C5, F5, J5	90 per cent. more cuttings rooted in 4 weeks.
		G5, H5	35 per cent. more cuttings rooted in 5 weeks. See fig. 141.
Viburnum rhytidophyllum Stem cuttings	July	A3	100 per cent. rooted. Better root system than controls.
" Bud cuttings "		A3, B3, X3	40 per cent. more cuttings rooted in 6 weeks. (All the plants grew on well.)

In every case there were adequate control series, as well as the treated series listed. In the above table particular attention is drawn to the increased number of cuttings which rooted in a given time. This clearly also shows the acceleration of the rooting process. In all cases a more profuse root system was formed; this is not mentioned in the table for every plant. Where all the control cuttings rooted readily, as for example with *Libonia floribunda*, the treated plants possessed a more profuse system of roots.

RESULTS WITH LESS READILY PROPAGATED PLANTS.

Without chemical treatment many of the cuttings may not usually form roots, or the rooting process may be inconveniently slow (see graph, fig. 135). Thus these plants tend to be uncommon in gardens or more expensive when purchased. In other localities this grouping might be invalid.

TABLE IV. RESULTS WITH LESS READILY PROPAGATED PLANTS.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Abelia grandiflora	June	B5, F5, f5	70 per cent. more cuttings rooted in 4 weeks. See fig. 138.
	August	C3	90 per cent. more cuttings rooted in 4 weeks.
Arctostaphylos patula	June	B5, D5, F5	60 per cent. more cuttings rooted in 6 weeks. See fig. 139.
Bignonia Unguis-cati	May	H5	70 per cent. more cuttings rooted in 8 weeks.
Buddleia Fallowiana	September	E5	95 per cent. more cuttings rooted in 4 weeks.
		B5	25 per cent. more cuttings rooted in 4 weeks. See fig. 137.
Callistemon speciosus	July	C4	15 per cent. more cuttings rooted in 4 weeks.
Camellia japonica	August	B1	All rooted in 10 weeks.
		Y	25 per cent. more cuttings rooted in 8 weeks.
Chaenomeles (Cydonia) japonica var. *alpina*	September	B8	75 per cent. more cuttings rooted in 5 months

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Chaenomeles (*Cydonia*) *japonica* var. *alpina*	September	C5	10 per cent. more cuttings rooted in 5 months.
Cornus Mas . . .	May	C5	30 per cent. more cuttings rooted in 7 weeks.
Correa speciosa var. *Harrisii*	October	B11	85 per cent. more cuttings rooted in 18 weeks.
		C3	10 per cent. more cuttings rooted in 18 weeks.
Disanthus cercidifolia .	August	B5	50 per cent. more cuttings rooted in 5 weeks.
		f5	40 per cent. more cuttings rooted in 5 weeks.
		P4	10 per cent. more cuttings rooted in 5 weeks.
Drimys Winteri . .	February	C4	10 per cent. more cuttings rooted in 8 weeks.
Epacris ardentissima .	January	B7, C5	75 per cent. more cuttings rooted in 4 months.
Epigaea repens . .	October	C3	85 per cent. more cuttings rooted in 8 weeks.
Erica canaliculata . .	January	B7	50 per cent. more cuttings rooted in 4 weeks.
		A5	15 per cent. more cuttings rooted in 4 weeks.
Escallonia montevidensis .	November	E6, F6, J6	50 per cent. more cuttings rooted in 7 weeks.
Feijoa Sellowiana . .	January	A4	20 per cent. more cuttings rooted in 11 weeks.
		X4, Y, Z	10 per cent. more cuttings rooted in 11 weeks.
Halesia carolina . .	June	C4, D4	20 per cent. more cuttings rooted in 7 weeks.
Lithospermum rosmarinifolium	April	B5, F5	55 per cent. more cuttings rooted in 7 weeks.
Loropetalum chinense .	June	B5, J5, j5	100 per cent. more cuttings rooted in 7 weeks.
		C5	65 per cent. more cuttings rooted in 6 weeks.
		H5	55 per cent. more cuttings rooted in 6 weeks.
		F5, f5	33 per cent. more cuttings rooted in 6 weeks.
Lupinus albifrons var. *Douglasii*	October	B8, C8	15 per cent. more cuttings rooted in 4 weeks.
		Z8	15 per cent. more cuttings rooted in 4 weeks.
Monarda citriodora . .	August	P3, P5	65 per cent. more cuttings rooted in 8 weeks.
Polygonum baldschuanicum	January	B6	More profuse root system but equal to control in number rooted.
Prunus incisa . . .	October	C8	40 per cent. more cuttings rooted in 4 weeks.
		A3, Y6	20 per cent. more cuttings rooted in 4 weeks.
Rosa × *Coryana* . .	July	B5, f5	100 per cent. more cuttings rooted in 24 days. See fig. 140.
Rosa Soulieana . .	July	f8	50 per cent. more cuttings rooted in 21 days.
		B8	10 per cent. more cuttings rooted in 21 days.
		g8	Equalled control.
Salvia × *superba* . .	July	B12	30 per cent. more cuttings rooted in 4 weeks.
		X12	20 per cent. more cuttings rooted in 4 weeks.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Taxus baccata . . .	December	C4	33 per cent. more cuttings rooted in 7 weeks. See graph, fig. 135.
Viburnum × *Burkwoodii* .	July	C3	50 per cent. more cuttings rooted in 6 weeks.

The gains resulting from treatment are shown by the greater number of rooted cuttings in a given time, but were not limited to this, as in some cases no controls rooted at all, in others the root systems of the control cuttings developed sparsely and slowly.

PLANTS DIFFICULT TO PROPAGATE BY CUTTINGS.

Tests have also been made with plants known to be difficult to propagate by cuttings. A list of these has been prepared by a Committee of workers from various institutions, in co-operation with nurserymen, and published in The Gardeners' Chronicle; already correspondents have reported that certain of these plants can be propagated from cuttings. Some of those here reported are also to be found in the Committee's list of difficult plants.

TABLE V. RESULTS WITH PLANTS DIFFICULT TO PROPAGATE BY CUTTINGS.

	Date.	*Treatments.*	*Results due to Treatments, and Notes.*
Arbutus Unedo var. *rubra* .	November	B6	33 per cent. cuttings rooted in 15 weeks. Controls nil.
Cornus florida . .	September	B3	15 per cent. cuttings rooted in 15 weeks.
		C3	10 per cent. cuttings rooted in 15 weeks.
		A3	Equal to controls nil.
Osmanthus Delavayi . .	July	A3	45 per cent. cuttings rooted in 2 months.
		C3	Equal to controls nil.
Parrotia persica . .	July	B4	33 per cent. cuttings rooted in 4 weeks.
		A4	10 per cent. cuttings rooted in 4 weeks.
		C4	Equal to controls nil.
Pinus insignis (3-year-old plants)	October	B4	20 per cent. cuttings rooted in 6 months.
		A4	Equal to controls nil. See fig. 136.
Pittosporum tenuifolium .	February	C4	15 per cent. cuttings rooted in 8 weeks.
		B4	Equal to controls nil.

THE AFTER-GROWTH OF TREATED ROOTED CUTTINGS.

Very few rooted cuttings were lost when given care in the transference to the soil. A short period of gradual "hardening" is desirable, as sudden change from a moist atmosphere to a dry one may lead to damage. The majority of treated cuttings grew on satisfactorily and large numbers of plants have been so raised. There was no detrimental "after effect" provided that the dosage was correct; if too strong concentrations were used then direct damage to the tissue and also bud inhibition were caused. α-Naphthylacetic acid has proved rather more apt to cause such damage than indolyl butyric acid, but care and experience prevent this. Using a series of a thousand cuttings of Yew treated with α-naphthylacetic acid, the rooted plants from the treated series were obtained so much earlier (see graph) and with a better root system; their growth has continued to be far in advance of that of plants from untreated cuttings. This raises the question whether it is worth while to treat cuttings which root readily without treatment. The gain lies in the more profuse root system developed, which should give the young plant a material advantage over one possessing a weaker root system. Where the plants are required for "forcing" or where rapid growth is to be encouraged by high manuring, plants with a more highly developed root system would in all probability be preferred. These are points of value to the grower.

Failures.—Attempts have also been made to propagate by cuttings the following plants at the time of year shown—these have resulted in failure, both with and without chemical treatments.

Abies squamata (April).
Asparagus acutifolius (August).
Carpenteria californica (July).
Cephalotaxus drupacea (March).
Cotoneaster serotina (October).
Cupressus arizonica var. *glauca* (January).
Cyrilla racemiflora (April).
Cytisus Lady Moore (October).
Elaeagnus angustifolia (July).
,, *pungens* var. *variegata* (June).
Erica Plukeneti (May).
Gordonia sp. (February).
Grevillea bipinnatifolia (July).
Hamamelis japonica (July).
,, *mollis* (July).
Hoheria sp. (September).
Indigofera decora (August, September).
Magnolia glauca (October).
,, *Kobus* (August, September).
Nothofagus antarctica (September).
,, *Dombeyi* (September).
Osmanthus ilicifolius vars. (April).
Phillyrea latifolia (May).
Picea pungens (December).
Pinus cembroides (October).
Pistacia chinensis (September).
Pittosporum Colensoi (July).
Pomaderris apetala (May).
Quercus agrifolia (December).

It may be that attempts made with cuttings taken at other seasons would have been successful, and treatments differing in concentration or duration may be required. At present there are many plants which do not respond to treatment. At Kew a corresponding group of species has been observed and anatomical investigation of them leads Dr. METCALFE to suggest that the hard fibres in the outer zones of the stem do not permit the ready entrance of the active substances to the cambium known to be responsive (TINCKER, 1937), and may also or alternatively prevent the young root initials produced by cell division from emerging from the stems. Further investigation along such lines may show the cause of the failure of cuttings of such species to develop roots.

Uptake of solution and effective " dosage "—approximations.—Experience shows that for most plants the effective concentrations lie between the limits of $\frac{1}{10000}$ and $\frac{1}{50000}$, that is between 100 and 20 parts per million.

Direct estimations of the volume of solution taken up have been made; these vary with the species and conditions of experiment, but two examples will suffice.

Using small cuttings such as *Myrtus communis*, some 2 to 3 inches in length, the volume of solution taken up by each cutting in a day in winter averaged 0·125 cc. This was sufficient for stimulation. The fresh weight of each cutting approximated to 0·5 gm. with a dry weight of 0·16 gm. Now the region stimulated, as judged by the region showing the response, was about ¼ of the total weight, assuming that all the tissues in this region take up all the solution; thus 0·04 gm. of tissue reacts to 0·125 cc. of a solution of $\frac{1}{30000}$, which means that 1 gm. of tissue responds to $\frac{1}{10000}$th part of a gm. of the chemical: the order of magnitude of the reaction lies near 1×10^{-4}.

Using large leafy cuttings weighing 7·5 gm. each, fresh weight, the average uptake in a day in summer was 1·2 cc. per cutting, the effective concentration was $\frac{1}{20000}$. The dry weight of each cutting was 2·8 gm., of which 0·7 gm. may be regarded as containing responsive tissues. If we again suppose that the chemical is confined to that region, a similar order of magnitude is arrived at, 1 in 10^{-4}.

That such estimations are only rough approximations will be readily realized when it is considered that the active region of cell division is usually limited to the cambium and adjacent cells of the phloëm, and little evidence is available concerning the lateral spread of the substances in the stem.

THE USE OF VITAMIN B_1 (ANEURIN) IN PROPAGATION.

It has been established by ROBBINS, BONNER, and others that roots grown *in vitro* need traces of vitamin B_1 for their successful continued growth. Other investigators have found that additional traces of this substance have caused accelerated opening of buds and increased the rate of growth on side shoots. It therefore seemed a promising line of work to test the use of this substance with cuttings used for propagation. Fortunately there is no serious interaction of a chemical nature between vitamin B_1 (aneurin) and the root-producing substances, so that they can be mixed together in the same solution, and taken up together by the cutting.

Tests have been made with numerous series of cuttings using herbaceous and woody plants. The concentration of the vitamin has varied between $\frac{1}{10000}$ and $\frac{1}{1000000}$. The following results have been obtained:

(*a*) Aneurin alone did not induce root formation from cuttings.

(*b*) The addition of aneurin to a growth substance did not generally make roots develop with plants with which the growth substance failed. One possible exception was recorded—cuttings of *Schima argentea*, previously treated with naphthylacetic acid and subsequently treated with aneurin after an interval of several months, then produced roots in a few cases.

(*c*) In a third of the total experiments a higher percentage of rooted cuttings was obtained by the use of aneurin as well as the growth substance. The plants responding thus included: *Abelia grandiflora*, *Erica canaliculata*, *Polygonum baldschuanicum*, *Schima argentea*, *Sycopsis sinensis*. In half the number of experiments made with plants responding to growth substances, the addition of aneurin had a small effect in increasing the number of rooted cuttings.

(*d*) A much better root system was developed from cuttings receiving the aneurin, in the case of *Abelia grandiflora*. Only with this plant was a really significant difference observed in the rate of development of the shoots and buds due to the aneurin. This experiment was repeated and confirmed.

(*e*) *Nicotinic Acid.*—A few tests have been made with nicotinic acid used together with the growth substances; as yet sufficient evidence has not been collected.

At the present time there is some evidence that vitamin B_1 may assist in propagation, but the uncertainty of the results makes one reluctant to recommend its general use. WENT, BONNER and WARNER considered aneurin to be a hormone-like substance regulating the growth of roots. They obtained with Camellia and with Lemon results similar to those reported with *Schima argentea*, indicating that aneurin influenced the development of root primordia already formed. They found that the best results were obtained by administering the aneurin approximately a week after the root-forming substance was taken up. The concentrations ranged upwards from 1 mg. per litre of aneurin, a concentration of 1 part per million.

THE USE OF POWDERS FOR PROPAGATION PURPOSES.

The active substance is carried by talc used in different proportions. Evidence shows that the fineness of the powder is important, as no doubt a finely-ground powder will give a solution more readily, and the increased surface available will facilitate the various reactions taking place. Generally the powders have given fairly satisfactory results in the tests carried out, but compared with the results obtained from solutions of the optimum concentration the powders have not been so satisfactory. The amount of powder adhering to stems of the same series differs from cutting to cutting; further, certain plants with fine hairs or a rough outer surface hold more powder than cuttings with a smooth glossy surface. Nevertheless, despite these points, the powders do their work; they do not cause roots to develop from as great a length of stem as do the solutions, but they do cause a more profuse root system than would be developed without their use; in this respect they occupy an intermediate position.

They are easily handled, there is no necessity for any dilutions to be calculated or made, and the operator can use them very rapidly, inserting the cuttings at once, sacrificing a degree of efficiency for a more rapid method. Powders are readily available containing one or more of the active substances discussed in this article.

OTHER FACTORS IN PROPAGATION.

In all propagation work there must remain other factors, such as the condition of the material, and the season at which attempts are made. Recently the results obtained by THIMANN and DELISLE have clearly shown that certain coniferous trees may be reproduced vegetatively by cuttings treated with growth substances provided the cuttings are taken from young wood and young trees. The age factor of the parent is important, and similarly lateral branches have proved superior to terminal cuttings. There is here a wide field for exploration of the internal conditions of the material, both as to its anatomical structure and to its physiological activity. At the same time the use of these substances has widened the season at which cuttings of many plants may be taken and has also widened the range of wood that may be propagated, but, speaking generally, more success has been obtained with soft-wood cuttings in which the cambial ring has been recently completed than in hard-wood cuttings. The use of these growth substances is, however, not confined to wood cuttings. SKINNER has found that many species and varieties of Rhododendrons and Azaleas can be propagated by " leaf-bud " cuttings, consisting of a leaf, its petiole or stalk with its bud and a shield-shaped piece of wood cut out of the stem. These root readily, but by the use of indolylbutyric acid the rooting was facilitated. Powders, although not quite as effective as solutions, also proved useful. SKINNER used a temperature of 70–75° F. This is the type of cutting used with *Viburnum rhytidophyllum* in the earlier Wisley experiments, where, with too high concentrations, the growth of the bud was inhibited, but many plants have now been raised by this method, using rather more dilute solutions. Thus the substances may be used successfully on different kinds of stem cuttings where rooting is desired.

COMPARATIVE VALUE OF THE CHEMICALS TESTED FOR PROPAGATION.

The most valuable substances for propagation are undoubtedly:

(*a*) indolylbutyric acid.
(*b*) tetrahydronaphthylideneacetic acid (m.p. 92° C.) " A."
(*c*) the mixed acids referred to previously as J.

It is difficult to separate satisfactorily the first two substances, for with many species the former gave a better result and with an *equal* number of other species the second gave the best result. The behaviour of the mixed acids very closely resembled that of the second acid. There seemed to be no guiding principle, readily apparent, as to the cause of one species reacting more favourably to one substance.

There was a difference in the type of root systems produced. The indolylbutyric acid produced a more fibrous root system; the second acid, "A," caused thicker roots to be formed. These were usually produced on a greater length of the cutting; this was correlated with the greater length throughout which cell division and internal callus formation took place. The mixed acids tended to produce similar effects. For these reasons the second acid, "A," is considered the most powerful agent causing cell division and root formation; indolylbutyric acid may, however, have a slightly wider range of applicability.

A second group of very useful compounds comprises:

(*a*) α-naphthylacetic acid.
(*b*) dihydronaphthylacetic acid.
(*c*) tetrahydronaphthylacetic acid.

The difference in efficiency observed between the first two acids is negligible, the third acid is not quite so efficient.

A third group of useful compounds comprises:

(*a*) tetrahydronaphthylideneacetic acid (m.p. 163° C.) "B."
(*b*) indolylacetic acid.

It must be clearly stated that this evaluation of the relative efficiency of the compounds is based on our own results; and with another series of selected plants it may be possible to reverse the positions of the substances *within* the groups, but, having tested a large number of plants, it appears unlikely that the major divisions in the groups will be materially altered.

The sodium salts of the acids are highly effective and readily soluble.

CONCLUSIONS.

I. Since the publication of the earlier papers the ready supply of active substances has permitted their widespread use and more and more plants have been shown to respond to the available growth substances so that their propagation can be accelerated. (See for example the works of METCALFE (1939) and PEARSE (1939).

II. There is yet a number of plants which have not responded to treatment—they defy the propagator. If it be found that there are means—as by the use of reduced pressure, already successfully employed with certain plants by JACKSON—of introducing the chemical to the cambium region, the list of refractory species will be further curtailed. It may also be possible to assist the emergence of roots by cutting or making an incision in the stem of plants possessing an enclosing ring of unyielding tissues. Further experimentation will decide, and here the value of aneurin may be found as an accelerator of development of induced root primordia.

III. At the present time the use of the root-forming substances, including those described as active for the first time, and the vitamin (aneurin), in the propagation of species not considered in any way difficult to root from cuttings, is well worthy of careful consideration as the better root systems obtained offer real improvements to cultivators.

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To Messrs. May & Baker Ltd., Dagenham, London. (Seradix A.)

To Messrs. Mercke & Co., Rahway, New Jersey, U.S.A. (through Messrs. May & Baker Ltd.). (Hormodin A and Hormodin Powders.)

To Messrs. Pennsylvania Chemical Co., New York. (Auxilin.)

To Messrs. Plant Protection Ltd., Yalding, Kent. (Hortomone A.)

To Messrs. Roche Products (Hoffmann La Roche), Basle. (Roche 202.)

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PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

Centaurea dealbata var. Steenbergii. A.M. October 24, 1939. From Messrs. Perry, Enfield. *Centaurea dealbata* is a familiar border plant with attractive foliage and bright rose-pink flowers produced over a long period. The present variety, which was discovered in the garden of a small nurseryman named Steenberg near Copenhagen, differs in having flowers of a grey hue of Orchid Purple (H.C.C. 31), a much deeper colour than that of the type.

Cotoneaster Wardii. A.M. October 24, 1939. From Mr. W. J. Marchant, Wimborne. A handsome half-evergreen species from south-eastern Tibet. The growths reach a height of 6 to 9 feet, are freely branched, and bear ovate leaves an inch long, dark glossy green above and white-tomentose beneath. The flowers are carried on short lateral twigs arising from the previous year's wood, and are followed by bunches of four or five large, broadly obovoid, bright red berries.

Laeliocattleya × 'Karen' var. 'Magnificent.' A.M. October 24, 1939. The robust plant bore a spike with two large flowers, purplish-mauve, the labellum mottled with ruby-crimson and displaying a golden colour in the throat portion. The margin of the petals is undulated and that of the labellum deeply frilled. The result of crossing *L.-c.* × 'Sargon' with *C.* × *Peetersii*. Raised and shown by Messrs. H. G. Alexander, Tetbury, Glos.

Mahonia lomariifolia. F.C.C. October 24, 1939. From Major Lawrence Johnston, Chipping Campden. This species received the **A.M.** as a foliage plant on May 24, 1938, and is described in the

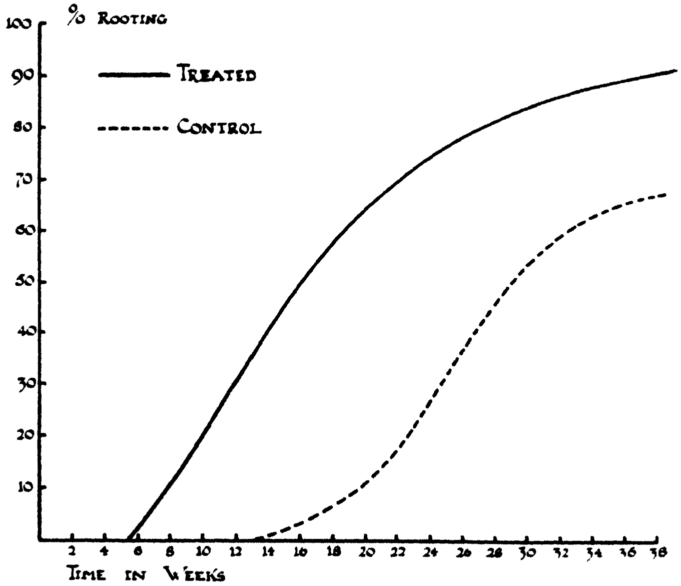

FIG. 135. GRAPH SHOWING THE ROOTING OF YEW (TAXUS BACCATA) CUTTINGS TREATED WITH α-NAPHTHYLACETIC ACID $\frac{1}{20000}$ FOR 48 HRS.

Cuttings were taken in December. 50 per cent. of the control cuttings rooted in 6 months. 50 per cent. of the treated cuttings rooted in 3 months

(see p. 557)

[*To face p.* 566.

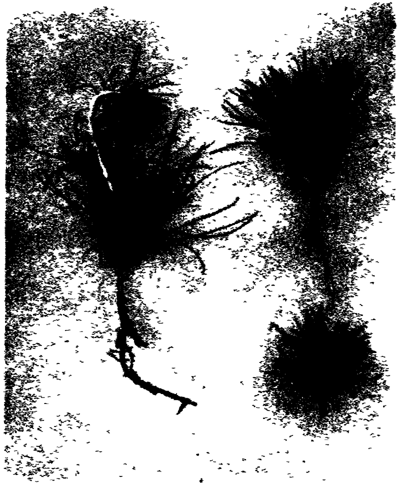

FIG. 136.—ROOTED CUTTINGS OF LATERAL BRANCHES OF YOUNG TREES OF PINUS INSIGNIS TREATED WITH INDOLYLBUTYRIC ACID $\frac{1}{20000}$ FOR 48 HRS

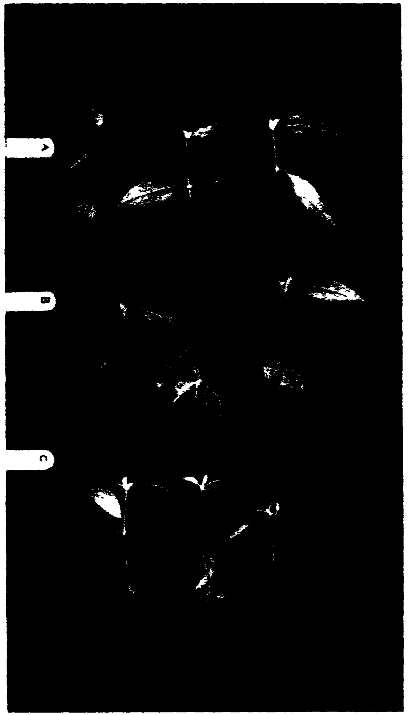

FIG 137.—BUDDLEIA FALLOWIANA TAKEN IN SEPTEMBER. (A) Controls (B) Tetrahydronaphthylideneacetic acid "A" $\frac{1}{30000}$ for 24 hrs. (C) Indolylbutyric acid $\frac{1}{30000}$ for 24 hrs. Photographed 4 weeks later.

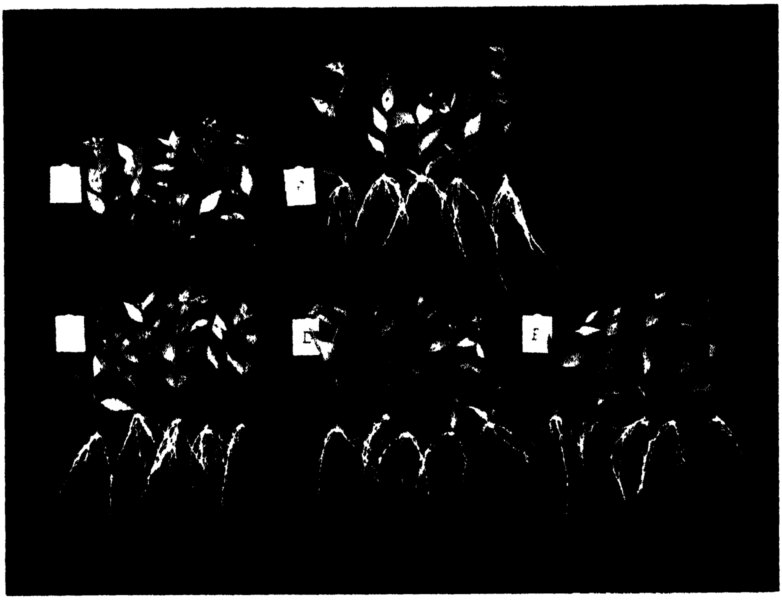

FIG. 138 CUTTINGS OF ABELIA GRANDIFLORA TREATED IN JUNE.

(A) Controls. (B) Indolylbutyric acid $\frac{1}{30000}$ for 24 hrs. (C) Tetrahydronaphthylidene acetate "A" $\frac{1}{30000}$ for 24 hrs. (D) (C) and vitamin B_1 (aneurin) $\frac{1}{30000}$ for 24 hrs (E) (C) and nicotinic acid $\frac{1}{30000}$ for 24 hrs Photographed 28 days after treatment.

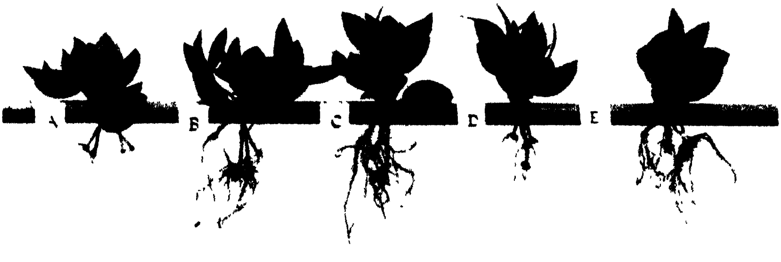

FIG. 139.—ARCTOSTAPHYLOS PATULA TAKEN IN JUNE

(A) Control. (B) Dihydronaphthylacetic acid $\frac{1}{30000}$ for 24 hrs. (C) Tetrahydronaphthylideneacetic acid "A" $\frac{1}{30000}$ for 24 hrs. (D) Tetrahydronaphthylideneacetic acid "B" $\frac{1}{30000}$ for 24 hrs. (E) Indolylbutyric acid $\frac{1}{30000}$ for 24 hrs. Photographed 2 months later

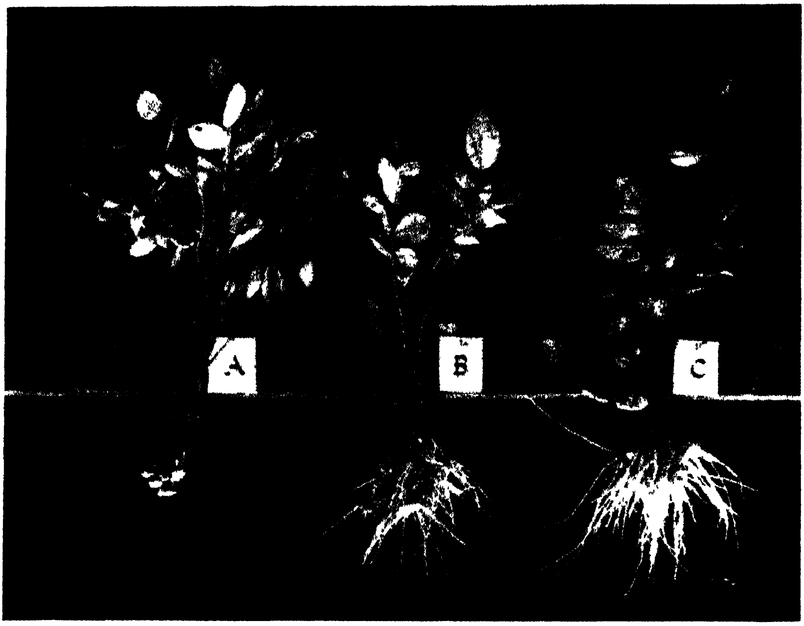

FIG. 140.—CUTTINGS OF ROSA × CORYANA TREATED IN JULY.

(A) Control. (B) Indolylbutyric acid $\frac{1}{30000}$ for 24 hrs. (C) Tetrahydronaphthylidene acetate "A" $\frac{1}{10000}$ for 24 hrs Photographed 3 weeks later.

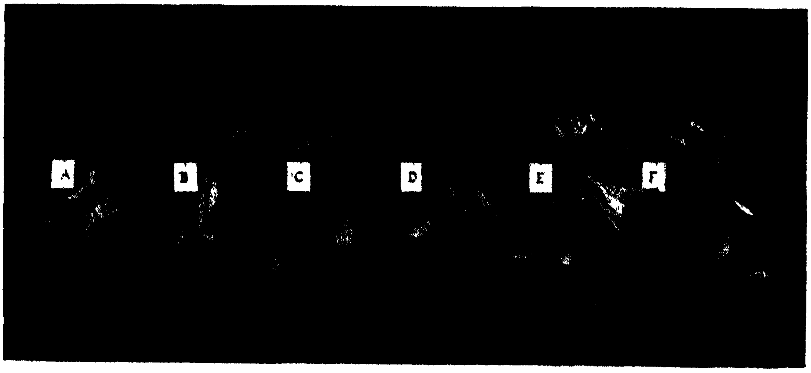

FIG. 141.—VIBURNUM FRAGRANS TREATED IN MAY.

(A) Control. (B) Sodium-tetralolacetate $\frac{1}{30000}$ for 24 hrs. (C) Tetrahydronaphthylideneacetic acid "A" $\frac{1}{30000}$ for 24 hrs. (D) "Mixed acids" $\frac{1}{30000}$ for 24 hrs. (E) α-naphthylacetic acid $\frac{1}{30000}$ for 24 hrs (F) Indolylbutyric acid $\frac{1}{30000}$ for 24 hrs.

Journal, Vol. 63, pp. 335–6. The specimen exhibited by Major Johnston was a single-stemmed plant nearly 3 feet high, approaching the flowering stage. The apical bud had produced a cluster of fifteen erect, sparingly-branched racemes about 10 inches long, closely set with a large number of flower-buds of which the lowest were on the point of opening.

Nerine 'Alice.' A.M. October 24, 1939. From Lionel de Rothschild, Esq. (gr. Mr. F. Hanger), Exbury, Southampton. Flowers 2½ inches diameter, white, delicately flushed with very pale Carmine-Rose (H.C.C. 621/3) and having a streak of a deeper shade of that colour along the middle of each segment. The plant exhibited bore an umbel of eight flowers.

TRIALS OF HARDY BORDER CARNATIONS AT WISLEY, 1938 AND 1939.

One hundred and twenty-four varieties of Hardy Border Carnations were grown at Wisley during the 1937–38 season and a similar number in 1938–39. They were selected by the Joint Committee of the Royal Horticultural Society and the National Carnation and Picotee Society. The collection of Hardy Border Carnations at Wisley, begun in 1936, is now maintained as standards against which the new varieties are tested.

The Awards are for value as hardy garden plants only.

White Selfs.

Limpsfield White (raised and sent by Mr. E. Charrington, Limpsfield). **A.M.** July 21, 1938.—2 feet, of compact habit. Flower stems very stout, rigid. Flowers 2¾ inches diameter, freely produced, centres rather full; petals broad, thick texture, entire, white; calyx strong.

Madonna (raised and sent by Messrs. Allwood, Haywards Heath). **H.C.** July 24, 1939.—15 inches, of compact habit, free flowering. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres somewhat loose; petals broad, entire, white with a creamy tint; calyx strong.

Margaret Day (raised and sent by Mr. Wm. Thorburn, East Cowes). **C.** July 21, 1938.—22 inches, of spreading habit. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres somewhat open; petals broad, entire, opening creamy-white passing to white; calyx strong.

Sincerity (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—18 inches, of vigorous growth, free flowering. Flower stems long, stout and rigid. Flowers 2¾ inches diameter, centres rather full; petals broad, slightly fringed, white with a creamy tint; calyx strong.

The following varieties are retained for comparison: Cottage White, **H.C.** 1937; Inez, **H.C.** 1937.

The following varieties have been discarded: Mrs. Thornburn; Sussex White.

Yellow Selfs.

The following varieties are retained for comparison: ETTRICKDALE, **H.C.** 1936; YELLOW BEAUTY, **C.** 1936.

The following variety has been discarded: BEAUTY OF CAMBRIDGE, **H.C.** 1936.

Apricot and Orange Shades.

Cottage Orange (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—18 inches, of vigorous growth and very free flowering. Flower stems long, stout and rigid. Flowers 2¾ inches diameter, centres full and high centred; petals broad, slightly fringed, Mandarin-Red (H.C.C. 17/1), banded Geranium-Lake (H.C.C. 20); calyx strong.

The following varieties are retained for comparison: CONSUL, **H.C.** 1936; CRANLEIGH, **H.C.** 1937; EFFIE DEANS, **H.C.** 1937; NANCY CHURCHER, **H.C.** 1937.

The following varieties have been discarded: BELLA M. GRIER, **H.C.** 1936; LOYALTY; ELIZABETH SHIFFNER, **C.** 1936.

Pink Shades.

Eglantine Clove (sent by Messrs. Allwood). **H.C.** July 24, 1939.—1½ feet, of rather spreading habit. Flower stems stout, rigid. Flowers 2¼ inches diameter, freely produced, centres rather open; petals broad, entire, rich scarlet-cerise; calyx weak.

Talisman (raised and sent by Messrs. Allwood). **H.C.** July 24, 1939; **C.** July 29, 1938.—22 inches, very vigorous. Flower stems stout, rigid. Flowers 3¼ inches diameter, full centred; petals broad, slightly fringed, bright rich rose-cerise; calyx strong.

Delicosa (sent by Messrs. Allwood). **C.** July 29, 1938.—2 feet, of bushy habit. Flower stems rigid. Flowers 2¾ inches diameter, of good form; petals broad, pale rose-pink; calyx strong.

Nautilus (sent by Messrs. Allwood). **C.** July 21, 1938.—20 inches, of bushy and compact habit. Flower stems stout, rigid. Flowers 2½ inches diameter, freely produced, centres full; petals broad, entire, light rose; calyx strong.

The following varieties are retained for comparison: ALPINK, **H.C.** 1937; BLUSHING BRIDE; COTTAGE SUPREME, **C.** 1937; INNOCENCE, **C.** 1936; ROSE BRADWARDINE, **H.C.** 1937; SALMON CLOVE, **H.C.** 1936; TEVIOTDALE, **A.M.** 1937.

The following varieties have been discarded: COTTAGE WONDER; ROYAL CLOVE, **H.C.** 1936; SUSSEX HAZE.

Old Rose Shades.

The following varieties are retained for comparison and future judgment: HARRIET HARROW; NAOMI ELLIS, **H.C.** 1936.

The following variety has been discarded: MISS ROSE JOSEPHS.

Scarlet Shades.

Red Rover (raised and sent by Messrs. Allwood). **A.M.** July 21, 1938.—26 inches, of vigorous growth. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres somewhat open, freely produced petals broad, entire, bright scarlet; calyx strong.

Coronation Scarlet (raised and sent by S. Maxfield, Esq., Stone Street, Gravesend). **C.** July 24, 1939.—2 feet, of vigorous growth. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres rather full; petals broad, entire, bright rich scarlet, clove scented; calyx strong.

Cottage Scarlet (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—15 inches, of compact bushy habit. Flower stems rigid, stout. Flowers 2 inches diameter, very freely produced; petals broad, entire, bright rich Scarlet (H.C.C. 19); calyx strong.

The following varieties are retained for comparison: FLAMBEAU, **H.C.** 1936; GRENADIER, **A.M.** 1936; MONTROSE, **H.C.** 1937; PASHA, **A.M.** 1937; SCARLET CLOVE, **H.C.** 1936.

The following varieties have been discarded: LIMPSFIELD SCARLET; SUSSEX RED.

Crimson Shades.

Darkie (raised and sent by Messrs. Allwood). **A.M.** July 29, 1938.—2 feet, of compact bushy habit. Flower stems long, stout and rigid. Flowers 3 inches diameter, centres rather open; petals broad, dark rich crimson; calyx strong.

Joan Wardale (raised by Mr. G. D. Murray and sent by Messrs. Allwood). **A.M.** July 21, 1938.—Described R.H.S. JOURNAL, **62**, part 10, p. 459. (**H.C.** 1936.)

The following varieties are retained for comparison: COTTAGE CRIMSON, **H.C.** 1936; COUNTESS OF LONSDALE, **A.M.** 1936; MRS. EVELYN LAKE, **H.C.** 1936; OAKFIELD CLOVE, **H.C.** 1936.

The following varieties have been discarded: MAROON CLOVE, **C.** 1936; GORDON DOUGLAS, **A.M.** 1936; WINDSOR CLOVE, **H.C.** 1936.

Mauve and Lilac Shades.

Thora Cox (raised and sent by C. S. Cox, Esq., Langley, Bucks.). **H.C.** July 24, 1939.—2 feet, of vigorous growth. Flower stems long, stout and rigid. Flowers 2¾ inches diameter, rather full centres; petals broad, entire, greyish Mallow-Purple (H.C.C. 630/1); calyx strong.

The following varieties are retained for comparison: COTTAGE MAUVE, **C.** 1937; GLEN SHEE, **H.C.** 1937; LAVENDER CLOVE, **C.** 1937; MRS. H. A. KNAPTON, **A.M.** 1937; ROBIN GRAY, **H.C.** 1936.

The following varieties have been discarded: BORDER MAUVE; MISTY MORNING; RAYMOND HOWE, **A.M.** 1936.

Fancies.

Sussex Gem (raised and sent by Messrs. Allwood). **A.M.** July 21, 1938.—16 inches, of very compact bushy habit. Flower stems stout and rigid. Flowers 2¾ inches diameter, very freely produced, centres open; petals broad, entire, light pink, lightly edged and pencilled pale scarlet; calyx strong. A perpetual border variety.

Ida Gray (raised by Mr. G. D. Murray and sent by Mr. F. E. Gray of Woodford Green, Essex). **A.M.** July 24, 1939.—18 inches, of bushy habit, with stout rigid stems. Flowers 2¾ inches diameter, freely produced ; petals broad, entire, bright cerise banded and striped with pale heliotrope ; calyx strong.

Arna Rides (raised by Mr. G. D. Murray and sent by Mr. F. E. Gray). **H.C.** July 21, 1938.—Described R.H.S. JOURNAL, **62**, part 10, p. 460. (**C.** 1936.)

Downs Delight (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—2 feet, of rather spreading habit ; stems stout, rigid. Flowers 2¾ inches diameter, centres rather full ; petals broad, entire, orange-apricot flushed and flaked with maroon ; calyx strong.

Downs Mist (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—20 inches, of vigorous growth, with stout rigid flower stems. Flowers 3 inches diameter with rather full centres ; petals broad, entire, purplish-heliotrope flaked scarlet ; calyx strong.

The following varieties are retained for comparison and future judgment : EBOR, **A.M.** 1936 ; EBORIAN ; HARMONY, **F.C.C.** 1937 ; MARGARET, **H.C.** 1937.

The following varieties have been discarded : COTTAGE GEM ; EVENING GLOW, **H.C.** 1936 ; SILVER STAR ; SUSSEX BEAUTY.

White Ground Fancies.

Galaxy (raised by Mr. Woolman and sent by Messrs. Gibson of Cranleigh). **F.C.C.** July 21, 1938.—Described R.H.S. JOURNAL, **62**, part 10, p. 461. (**A.M.** 1936.)

Lady Milne-Watson (raised and sent by Mr. E. Baldry of Dagenham, Essex). **H.C.** July 21, 1938.—20 inches, of bushy compact habit, with rigid flower stems. Flowers 2¼ inches diameter, full centred ; petals broad, entire, white ground, heavily flaked with wine-purple ; clove scented ; calyx strong.

Bookham Beau (raised by Mr. Douglas and sent by Messrs. Allwood). **H.C.** July 24, 1939.—1½ feet. Plant vigorous, of bushy habit, with stout rigid flower stems. Flowers 2¼ inches diameter, freely produced, centres somewhat open ; petals broad, entire, white ground, much flaked with scarlet; calyx strong.

Cottage Fancy (raised and sent by Messrs. Allwood). **H.C.** July 24, 1939.—22 inches, of vigorous bushy habit, with stout rigid flower stems. Flowers 2¾ inches diameter, centres rather full, freely produced ; petals broad, crenate, white ground, edged and flaked crimson-maroon ; calyx strong.

Sussex Hawk (raised and sent by Messrs. Allwood). **C.** July 21, 1938.—20 inches. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres full ; petals broad, slightly fringed, white ground, heavily flaked and banded deep crimson ; calyx strong. A perpetual border variety.

Downs Maid (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—24 inches, of spreading habit, with rigid flower stems. Flowers 2¾ inches diameter, freely produced, centres rather open ; white ground, flaked and edged with Geranium-Lake (H.C.C. 20/2) ; calyx strong.

Frances Kinnaird (raised and sent by Mr. E. Charrington). **C.** July 24, 1939.—15 inches, of bushy habit, with rigid flower stems. Flowers freely produced, 2⅜ inches diameter, centres full; petals broad, entire, white ground, lightly flaked with rose; calyx strong.

Lady Gay (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—18 inches, of vigorous growth, with stout rigid flower stems. Flowers 2¾ inches diameter, centres slightly open; petals broad, entire, white ground flaked and pencilled with scarlet; calyx strong.

The following varieties are retained for comparison and future judgment: Alice Forbes, **F.C.C.** 1937; Bookham Lass, **A.M.** 1936; Bookham Fancy, **H.C.** 1936; Bourock, **H.C.** 1936; Columbine, **A.M.** 1936; E. M Stephenson, **C.** 1936; Edenside Clove, **A.M.** 1936; Esmé Murray, **H.C.** 1936; Florence Wellstead, **A.M.** 1936; Glen Glory, **A.M.** 1936; Jean Batten; John Stobart, **H.C.** 1937; Limpsfield Fancy, **A.M.** 1936; Lord Kitchener, **H.C.** 1936, Merlin Clove, **A.M.** 1936; Mrs. A Brotherstone, **H.C.** 1936; Mrs. Edmund Charrington, **A.M.** 1936; Pauline, **C.** 1937; Ravenswood; Steerforth Clove, **A.M.** 1936; Robustus, **H.C.** 1937; Unique.

The following varieties have been discarded: Border Beauty; Cottage Warrior.

Yellow Ground Fancies.

Juna (raised and sent by Messrs. Allwood). **A.M.** July 24, 1939.—2 feet, of vigorous and bushy habit, with stout rigid flower stems. Flowers 2¾ inches diameter, freely produced, centres somewhat open; petals broad, entire, pale sulphur ground, flaked and lightly suffused with rose-cerise; calyx strong.

Betty Thain (raised and sent by R. Thain, Esq., of Shalford, Guildford, Surrey). **H.C.** July 21, 1938.—2 feet, of somewhat spreading habit, with stout rigid flower stems. Flowers 2⅜ inches diameter, freely produced, centres open; petals broad, margins crenate, sulphur ground, flaked towards the margins with light cerise; calyx strong.

Firetail Clove (raised and sent by Messrs. Allwood). **H.C.** July 21, 1938.—2 inches, of bushy habit. Flower stems stout, rigid. Flowers 2¾ inches diameter, centres full; petals broad, entire, apricot ground heavily suffused with scarlet; calyx strong; clove scented.

Lord Lonsdale (raised by Messrs. L. A. Lowe and sent by Messrs. Allwood). **H.C.** July 29, 1938.—20 inches, of vigorous habit, with stout erect flower stems. Flowers 2¾ inches diameter, freely produced; petals broad, of good substance, yellow ground marked and pencilled crimson-scarlet; calyx strong.

R. J. Day (raised and sent by Mr. Wm. Thorburn, East Cowes). **H.C.** July 21, 1938.—22 inches, of compact habit, with stout rigid flower stems. Flowers 2¾ inches diameter, open centres, freely produced; petals broad, entire, primrose ground, edged and flaked with deep rosy-red; calyx strong.

Julia B. Wells (raised and sent by Mr. E. Charrington). **H.C.** July 24, 1939.—2 feet, of vigorous growth, with stout rigid flower stems. Flowers 2¾ inches diameter, very freely produced, centres somewhat full; petals broad, entire, Primrose Yellow ground (H.C.C. 601/2) flaked and edged Rose Bengal (H.C.C. 25/2); calyx strong.

Maisie Thorburn (raised and sent by Mr. Wm. Thorburn). **H.C.** July 24, 1939; **C.** July 21, 1938.—2 feet, of vigorous habit, with stout rigid flower stems. Flowers 2¾ inches diameter, full centred; petals broad, entire, apricot ground, edged and lightly flaked with cerise; calyx strong.

Downs Beauty (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—22 inches, of spreading habit, with stout rigid flower stems. Flowers 3 inches diameter, centres somewhat full; petals broad, entire, Primrose Yellow (H.C.C. 601/3) flaked and edged with scarlet; calyx strong.

Happiness (raised and sent by Messrs. Allwood). **C.** July 24, 1939.—1½ feet, of compact habit, with stout rigid flower stems. Flowers 2¾ inches diameter, centres rather open; petals broad, slightly fringed, Primrose Yellow (H.C.C. 601/3) edged and flaked Geranium Lake (H.C.C. 20); calyx strong.

The following varieties have been retained for comparison: Allan A. Dale, **C.** 1936; Ben Moore, **H.C.** 1937; Centurion, **H.C.** 1936; Dainty, **H.C.** 1937, David Stobart, **H.C.** 1936; Downs Favourite; Downs Glory; Elizabeth Harrison; Flamingo, **C.** 1936; Florence Grisby, **H.C.** 1936; G. D. Murray; Hadrian, **A.M.** 1936; Juna, **C.** 1937; Mrs. T. B., **C.** 1936; Olive; Sheila Gibson, **H.C.** 1937; W. H. Brooks, **A.M.** 1937; Zebra, **H.C.** 1937.

The following varieties have been discarded: Downs Charm; Dream, Sunbeam; Suzette; Vanity; William R. Hill; Zephyr.

Picotees.

Firefly (raised and sent by Messrs. Allwood). **A.M.** July 24, 1939.—2 feet, of vigorous growth, with stout rigid stems. Flowers 2¾ inches diameter, centres rather open; petals broad, slightly fringed, Primrose Yellow ground (H.C.C. 601/2) broadly edged with rich rosy-purple; calyx strong.

Santa Claus (sent by Messrs. Allwood). **H.C.** July 24, 1939.—26 inches, of spreading habit, with rigid flower stems. Flowers 2¼ inches diameter, centres open; petals broad, entire, pale sulphur edged rosy-crimson; calyx strong.

Pink Braes (sent by Messrs. Allwood). **C.** July 21, 1938.—26 inches, of spreading habit. Flower stems stout, rigid. Flowers 2¼ inches diameter, freely produced, centres open; petals broad, entire, white ground, lightly edged with rose-pink; calyx strong.

The following varieties are retained for comparison: Fair Maiden, **H.C.** 1937; Paragon, **C.** 1936; Renée Nichols, **F.C.C.** 1936.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

REPORT OF THE COUNCIL

For the One Hundred and Thirty-Fifth Annual Meeting of the Society, to be held in the Lecture Room of the New Hall, Greycoat Street, Westminster, at 3 p.m. on Tuesday, February 21, 1939.

The Society's Progress.—A further welcome increase in the number of the Fellows of the Society has to be recorded.

The following tabulated figures of Fellowship show a net increase of 1,250 for the year.

Loss by Death in 1938.	
Honorary Fellows ..	2
Associates of Honour ..	6
Life Fellows	11
4 Guinea Fellows ..	5
2 „ „ ..	286
1 „ „ ..	300
Associates	2
	612

Loss by Resignation.	
4 Guinea Fellows ..	10
2 „ „ ..	695
1 „ „ ..	1,368
Associates	78
Affiliated Societies ..	25
	2,176

Elections in 1938.	
Associates of Honour ..	7
Life Fellows	24
4 Guinea Fellows.. ..	19
2 „ „	1,311
1 „ „	2,478
Associates	126
Affiliated Societies ..	73
	4,038
Deaths and resignations	2,788
Net Increase ..	1,250
Total on November 9, 1937	35,327
Total on November 8, 1938	36,577

The Society has lost during the year a number of notable horticulturists. From the ranks of those to whom the V.M.H. had been awarded there are Dr. A. B. Rendle, Honorary Fellow of the Society, its Honorary Botanist and a member of the Board of Examiners, and of the Scientific and other committees; Mr. F. J. Hanbury, a past member of the Council, a member of the Orchid Committee and an enthusiastic amateur gardener; Mr. H. White, of the Sunningdale Nurseries, an expert grower of Rhododendrons; Mr. G. Yeld, a well-known hybridizer of Irises and Hemerocallis. Of the Associates of Honour, Mr. W. B. Clark, Mr. A. Hosking, Mr. James Macfie, Mr. J. W. Scott and Mr. W. Stewart have died.

There must also be mentioned: Lord Rendlesham, a keen Daffodil grower and a member of the Narcissus and Tulip Committee; Lady Wightman, a member of Floral Committee A; Mr. E. H. Christy, an amateur grower of Sweet Peas; Mr. D. B. Crane, a member of Floral Committee A; Major G. Churcher, a member of Floral Committee A; Mr. J. S. Parker, late Chief Horticultural Officer of the Imperial War Graves Commission; and Mr. R. C. Notcutt, the well-known nurseryman and expert on shrubs and a member of Floral Committee B.

Fortnightly Meetings and Shows.—The Fortnightly Meetings and Shows in the Halls continue to draw increased attendances, and the exhibitors who have so well upheld the reputation of these shows deserve the Society's thanks and congratulations.

The competition for vases of flowers arranged by amateurs, started in 1937, was again held this November and attracted over 40 entrants who displayed the greatest skill in their exhibits.

The Daffodil Show.—The Daffodil Show was held on Tuesday and Wednesday, April 12 and 13. The earliness of the season was favourable to the northern growers while it did not prevent the southern growers from being able to send large exhibits.

A full account of the Show will be found in the Daffodil Year Book for 1938. The Show in 1939 will be held on Thursday and Friday, April 13 and 14. The Schedule may be obtained from the Secretary.

The Early Market Produce Show.—This Show was held for the seventh time in the Old Hall of the Society on Tuesday and Wednesday, April 12 and 13, when Mr. W. S. Morrison, Minister for Agriculture, honoured the Society with his presence and congratulated it on its work for the encouragement of early market produce.

The Show will be held in 1939 on Thursday and Friday, April 13 and 14. Mr. Ambrose Heath has kindly consented to lecture on this occasion on salads and salad vegetables.

Conference on Flowering Trees and Shrubs.—The Conference on Ornamental Flowering Trees and Shrubs, other than Rhododendrons, which was held on Tuesday, Wednesday and Thursday, April 26, 27 and 28, aroused great interest and was well attended throughout the sessions.

The Council desires to place on record its gratitude to the members of the committee, the readers of papers, the chairmen of the sessions as well as to the exhibitors at the show for their kind co-operation and assistance.

The proceedings of the Conference including the papers read thereat have now been published in an illustrated volume entitled "Ornamental Flowering Trees and Shrubs."

Rhododendron Conference.—It had been planned to hold a Rhododendron Conference in 1939, but the severe spring frost this year rendered it improbable that there would be a good display of bloom in 1939 and it was therefore decided to postpone the Conference until 1940.

Chelsea Show.—Their Majesties the King and Queen, Her Majesty Queen Mary and other members of the Royal Family graciously showed their continued interest in the Society's work by visiting the Chelsea Show which was held on Wednesday, Thursday and Friday, May 25, 26 and 27.

The arrangement of marquees which was made in 1937 was repeated and has proved its value to the visitors to the Show.

Attention is, however, drawn to the somewhat congested state of the traffic approaching the Show from the Royal Hospital Road. This would be greatly relieved if the Embankment entrance were used more.

The Chelsea Show in 1939 will be held on Wednesday, Thursday and Friday, May 17, 18 and 19.

Autumn Show.—The Council is continuing to use its best endeavours to arrange a great Autumn Show. Should its hopes materialize an announcement to that effect will be made public.

The Lily Group.—The four meetings and the visits to the gardens of Colonel Stephenson Clarke and the Hon. Mrs. Spender-Clay were well attended. A similar programme has been arranged for 1939.

Wisley.—The freehold property of the Hanbury Trust, comprising about 60 acres of the Gardens, has now been vested in the Official Trustee of Charity Lands.

Wisley : The Garden.—The abnormally dry and sunny early spring months were favourable for the majority of plants, many coming into flower much earlier than in former years. These ideal conditions were followed during April and May by severe frosts which damaged vegetation in general; and more especially Rhododendrons, Azaleas and flowering shrubs.

During April ground frosts were registered on 26 nights, and during May on 11 nights. By late summer, however, little damage remained to be seen.

The Gardens were again opened on Sunday afternoons to Fellows and their friends during the month of October as well as in the summer months, and many visitors have taken advantage of this to see the coloured foliage and late autumn flowers.

Flower and Vegetable Trials.—Amongst the attractive features in the Gardens appreciated by Fellows were the standard collections of Sweet Peas, Iris, Border Carnations and Dahlias, and the newly formed collection of Early-flowering Chrysanthemums.

During 1938 other Trials held at Wisley included China Asters (Ostrich Plume and Giant Comet types), and perennial Lobelias, which were both quite successful. The Trials of dwarf Godetias and Dimorphothecas were, however, unsuccessful and will consequently be repeated during 1939. Trials commenced during 1938 include those of Brompton and East Lothian Stocks, and of Belladonna varieties of Delphiniums.

Of the vegetable Trials the early varieties of Sweet Corn were highly successful, but owing to the somewhat abnormal weather conditions the Trials of late Peas, autumn sown Onions and Cos Lettuce were unsatisfactory. It is intended to repeat these Trials. A Trial of autumn-sown Cauliflowers is now in progress.

Demonstrations of Practical Garden Operations.—The demonstrations of practical garden work carried out in 1938 were well attended. Although each demonstration was repeated on consecutive days, it was frequently found necessary to duplicate the arrangements made for each day owing to the large attendance of Fellows and their friends.

Battleston Hill.—Further planting has been carried out in this new area, and in addition to Azaleas and Rhododendrons there have been planted Camellias, Eucryphias and Magnolias. A start has been made with the planting of the adjoining open ground recently acquired by the Society.

New Rhododendron Trial Ground.—During the autumn the trial plants of Rhododendrons and Azaleas previously grown at Exbury have been transferred to Wisley where they can be more conveniently visited by the Fellows.

The trial ground has been laid out to the west of Battleston Hill.

The thanks of the Society are due to Mr. Lionel de Rothschild for his kindness in arranging these trials and growing the plants at Exbury during the past few years.

Joint Commercial Fruit Trials.—The area of the Trial ground remains unaltered. The 1938 season has been the most disappointing one experienced since the beginning of the trials, owing to the spring frosts destroying the crops of all kinds of fruit.

Despite the absence of a fruit crop, a large number of growers and Fellows have visited the Trial grounds to obtain information regarding new varieties and cultural details, and the demonstrations have been attended by record numbers.

New plantings of Soft Fruits have been made.

The Wisley Laboratories: Investigations.—Experiments with various species of Lilies have been continued. Particular attention has been paid to the question of the seasonal development of the roots of selected species, and also to problems arising out of the delay usually observed in the germination of certain American species.

The Entomologist has undertaken an investigation into the susceptibility of many bulbous plants to the Narcissus strain of the Stem Eelworm. The susceptibility of species of Chrysanthemums to the Leaf Eelworm attacking such plants has also been determined. A further investigation has been carried out with many varieties of Chrysanthemums into the attack of the Tarnished Plant Bug (*Lygus pratensis*); a précis of present knowledge of the pest has been published in the JOURNAL during the year.

The question of the loss of Wallflowers during winter has been critically and experimentally examined in the department of Mycology, and a report has been published in the JOURNAL.

Two varieties of Antirrhinums have, in 1937 and 1938, been found to resist the Rust disease completely whilst under conditions of heavy infection; other varieties have also shown a high degree of resistance. Fortunately the new strain of the rust prevalent in America has not yet been observed in this country.

The future programme of the department includes an investigation into the value of winter treatments designed to check the Black Spot disease of Roses.

Advisory Services.—More than two thousand four hundred inquiries have been dealt with during the year by the Laboratory staff. These concern chiefly soils, manures and fertilizers, insect pests, and fungoid diseases.

Educational Exhibits.—During the year twelve exhibits were staged at the Society's Shows. An exhibit was also staged, by invitation, at the Royal Institution.

White Fly Parasite.—The White Fly Parasite has again been distributed from Wisley, and the largest demand yet made by Fellows was met in a satisfactory manner.

Expeditions.—It has always been the policy of the Society to take shares in plant-collecting expeditions, and during the year seeds have been received from Prof. H. Hu, whose collectors have been exploring the Upper Shweli Valley, China; from Mr. E. K. Balls, who has been searching Mexico; from Capt. G. Sherriff, who has again visited South-East Tibet; while plants from Albania and Macedonia have been sent by Dr. F. Lemperg.

Certain of the seeds and plants are available for distribution to the Fellows.

Lectures at the Hall.—The Council desires to record its thanks to the lecturers who have accepted the Society's invitation to assist at the Fortnightly Meetings, and especially to Mr. F. J. Chittenden who gave the Masters Memorial Lectures, taking as his subject "The Behaviour of Plants."

In the coming year the Masters Memorial Lectures will be given on April 18 and 19 when Dr. J. C. Willis will speak on "How Plants have found their Homes."

The Society's Publications.—The following publications have appeared during the year: the "Lily Year-Book for 1938"; the "Daffodil Year-Book for 1938"; "Ornamental Flowering Trees and Shrubs," being the report of the Conference held in April; and "Some Good Garden Plants," being an account of those plants that have received the Award of Garden Merit. The long outstanding Volume 147 of Curtis's Botanical Magazine, the cost of production of which was provided through the generosity of the late Mr. Reginald Cory, was likewise produced this year; the first volume of the Horticultural Colour Chart has been distributed and it is hoped that Volume II will be ready during 1939. The supplement to the Index Londinensis, covering 15 years (1921–35) is now in the press and should be published during 1939. Negotiations have taken place with the Delegates of the Oxford University Press for the joint production of a revised Nicholson's "Illustrated Dictionary of Gardening" of which Mr. F. J. Chittenden has consented to act as Editor. It is estimated that the work will take about four years to compile.

Deputations.—At the invitation of the Committee of the Empire Exhibition Flower Show at Glasgow a deputation of the Society visited the show and made awards. The Council desires to express its thanks to the organizing committee of the Exhibition for the kind hospitality to and for the arrangements made for the deputation.

International Horticultural and Entomological Congresses, Berlin.—Representatives of the Society attended these Congresses, at which they presided at certain meetings, contributed papers and acted in an advisory capacity on Committees.

The Council desires to express its thanks to the Congress authorities for their hospitality and for the assistance rendered to its representatives.

The Lindley Library.—During the twelve months ending on October 31, 1938, 1,940 books were lent from the Lindley Library, which was visited by over 1,586 people in the same period. From January 1 to November 10, 1938, 200 books and pamphlets have been added, the more noteworthy being:—W. P. C. Barton, "A flora of North America," 1821–23 (3 vols., col. pls.); G. Bitter, "Die Gattung Acaena," 1910–11; V. Cesati, "Stirpes Italicae rariores," 1840–43; L. Colla, "Herbarium Pedemontanum," 1833–37 (8 vols.); G. Costeo, "De universali stirpium natura," 1578; R. Dodoens, "Histoire des plantes," 1557; J. Martyn, "Historia plantarum rariorum," German ed., 1752 (col. pls.); G. Pontedera, "Anthologia," 1720; H. T. L. Reichenbach, "Monographia generis Aconiti," 1820–21 (col. pls.); E. Rolland, "Flore populaire," 1896–1906 (6 vols.); J. C. Rosenberg, "Rhodologia," 2nd ed., 1631; Shigemori, "Nippon teien shi zukan," 1937–38 (6 vols., in continuation); R. J. Thornton, "New Illustration of the sexual system of Carolus von Linnaeus," 1807 (col. pls.).

The Library's subscription to a large number of Horticultural and Botanical Periodicals has been continued so as to keep the sets up to date.

The Society's Examinations.—The results of the examinations in Horticulture for 1938 show a maintained and increased interest in this section of the Society's work.

The National Diploma in Horticulture has been awarded to 15 candidates.

Fifty candidates passed the Preliminary Examination.

In the General Examination Certificates were awarded to 398 Senior, and 126 Junior candidates. In the Teacher's Preliminary Examination in School and Cottage Gardening, 280 candidates were successful, of whom 17 were awarded the Advanced Certificate.

At the British Floral Art Diploma Examination, Diplomas were awarded to 13 candidates. The Examination for the National Certificate in Elementary Horticultural Practice, for the students at Farm Institutes was well supported this year, 81 candidates receiving the Certificate.

The Victoria Medal of Honour.—The Victoria Medal of Honour has been awarded to Dr. W. F. Bewley, C.B.E., for his research work on behalf of horticulture; to Mr. H. R. Darlington, a keen amateur Rose-grower; to Mr. F. G. Preston, Superintendent of the University Botanic Garden of Cambridge; and to Mr. G. Reuthe, a well-known grower of rare trees and shrubs.

The Associates of Honour.—The Associateship of Honour has been awarded to Mr. W. J. Blakey, Superintendent of the Floral Department at Wisley; Mr. J. Buckman, Head Gardener at Highdown, Goring-by-Sea; Mr. H. Elphick, Nursery Manager of Messrs. R. Wallace & Co. Ltd.; Mr. G. F. Johnson, Head Gardener at Waddesdon Manor, Aylesbury; Mr. J. Prior, foreman of Messrs. D. Stewart & Son, Ltd.; Mr. R. K. Sillars, late foreman of Messrs. Samsons Ltd., Kilmarnock; and to the late Mr. W. Stewart, Superintendent of the Grounds, Royal Hospital, Chelsea.

The Lawrence Medal.—The Lawrence Medal for the best exhibit staged at the Society's Shows during the year has been awarded to Messrs. Sutton & Sons, Ltd., for their exhibit of Vegetables, staged on October 11, 1938.

The Holford Medal.—The Holford Medal for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Halls of the Society has been awarded to Colonel Stephenson R. Clarke, C.B., LL.D., V.M.H., for his exhibit of Flowering Shrubs, staged on April 26, 1938.

The Veitch Memorial Medals.—Awards have been made as follows: A Gold Medal to Mr. M. B. Crane for his work on the genetics of fruit trees; and a Gold Medal to Miss I. Preston of the Central Experimental Farm, Ottawa, for her work in raising good garden plants.

The Sander Medal.—The Sander Medal has been awarded to the Hon. Henry S. Tufton for *Cymbidium* 'Janette' var. 'Jeanine,' shown on February 8, 1938, which was considered to be the best new greenhouse plant of general utility shown to the Society in the course of the year.

The George Moore Medal.—The George Moore Medal has been awarded to Mr. H. Barnard Hankey for Cypripedium 'Wendover,' shown on November 29, 1938, which was considered to be the best new Cypripedium shown to the Society in the course of the year.

The Williams Memorial Medals.—The Williams Memorial Medals for the best group of plants and/or cut blooms of one genus (fruit and vegetables excepted) which show excellence in cultivation, exhibited during the year have been awarded to Messrs. J. and A. McBean for their exhibit of Cymbidiums staged on March 22, 1938, and to Messrs. Blackmore & Langdon for their exhibit of Delphiniums staged on June 21, 1938.

The Reginald Cory Memorial Cup.—The Reginald Cory Memorial Cup for the raiser of the best new hardy hybrid of garden origin shown to the Society in the course of the year, has been awarded to Mr. E. Ballard for his *Hepatica* × *media Ballardii*, shown on March 8, 1938.

The Loder Rhododendron Cup.—The Loder Rhododendron Cup has been awarded to Mr. F. Gomer Waterer for his work on the cultivation and hybridization of Rhododendrons.

The Sherwood Cup.—The Sherwood Cup for the most meritorious exhibit at the Chelsea Show was awarded to Messrs. Blackmore & Langdon, for a mixed group of Begonias, Gloxinias and Delphiniums.

Gifts to the Society.—The Council wishes to express its gratitude to the many Fellows and friends of the Society for gifts of plants, seeds and books; to Mrs. Hall again for her gifts of prizes for Gladioli competitions in 1939 and to the Orchid Trade for the presentation of trophies for Orchid competitions for amateurs.

The Council also desires to thank Mr. F. Galsworthy for twelve paintings of the "Flowers of the Month," which are hung in the

Lecture Room ; to Major F. C. Stern for a water-colour drawing of Pæonies ; to Mrs. V. Higgins for a collection of paintings of Cacti and Succulents ; to Mr. Mark Fenwick for his help in supplying plants for the Alpine Meadow at Wisley ; to Mr. M. Haworth-Booth for a collection of lantern slides in colour ; to the executors of Mr. H. de T. Glazebrook for a bequest of £100 the revenue of which is to be devoted to prizes, and also to the executors of Mrs. A. C. Charrington for a bequest of £500 for the purposes of the Society.

Retiring Members of Council.—The Council desires to place on record the Society's deep gratitude to Mr. R. D. Trotter for his most valuable services as its Treasurer. Mr. Trotter, having accepted an important business appointment, resigned this office early in the year. Mr. George Monro was appointed to succeed him.

The Council also wishes to express its sincerest thanks to the other retiring members, namely : Mr. E. A. Bowles, Mr. J. B. Stevenson and Mr. L. Noël Sutton, for the very valuable services they have rendered to the Society during their time of office.

The Press.—The Council desires to record its gratitude to the Press for their friendly support and goodwill, and for their constant interest in the affairs of the Society.

Committees, Judges and Examiners.—The Society is deeply appreciative of the work of the members of the various Committees, of the Judges and of the Examiners. The success of the Society's work is largely due to the assistance so rendered.

Staff.—The Council desires to thank the Secretary and the staff at Vincent Square and the Director and the staff at the Society's Gardens at Wisley for their loyal and efficient work.

Signed on behalf of the Council,
ABERCONWAY.
President.

December 31, 1938.

Dr. ANNUAL REVENUE & EXPENDITURE ACCOUNT

		£ s. d.	£ s. d.
To London—			
Establishment Expenses less Allocations—			
Rent, Rates and Taxes		3,204 10 0	
Salaries and Wages		8,514 7 9	
Other Establishment Expenses, including Light, Fuel, Stationery, Professional Fees, and Renewals		5,055 18 3	16,774 16 0
,, Wisley—			
Net Expenditure for Year, as per separate Account			14,275 8 11
,, Printing and Postage of Journal and other Publications		10,629 15 6	
Less Sales and Advertisements . . .		3,404 16 3	7,224 19 3
,, Staff Pensions		1,332 10 0	
Less Contributions by Staff as per Scheme .		559 14 8	772 15 4
,, Meetings—			
Expenses, Labour and Overheads of Special and other Meetings		3,355 3 0	
Less Receipts		535 11 9	
		2,819 11 3	
Spring Meeting :	£ s. d.		
Receipts	10,447 12 0		
Less Expenses, Labour and Overheads .	8,967 16 9		
Net Receipts . .		1,479 15 3	1,339 16 0
,, Cups and Medals			494 15 4
,, Garden Inspections—			
Expenditure *less* Receipts			17 2 11
,, Contributions to Lindley Library, as per Trust Account—			
Purchase of Books		284 18 11	
Salaries, etc.		527 19 3	812 18 2
,, Special Expenditure—			
Expeditions, E. K. Balls		75 0 0	
,, Professor Hu		40 0 0	
,, Dr. Lemperg		8 0 0	
,, Capt. Kingdon Ward . . .		44 0 0	
Donations, Gardeners' Royal Benevolent Inst.		52 10 0	
,, Royal Gardeners' Orphan Fund .		21 0 0	
,, British Growers' Publicity Council		26 5 0	
,, Roads Beautifying Association .		50 0 0	
,, Rothamsted Experimental Station		105 0 0	
,, Royal Geographical Society .		10 0 0	
,, British Colour Council . .		5 5 0	
,, London Children's Gardens .		10 10 0	
Flowering Trees and Shrubs Conference .		155 4 8	
Berlin International Congress . . .		124 15 3	
Pritzel Revision		458 6 6	
Journal Index (Balance of Cost) . .		793 2 0	
Decorations to Old Hall		1,168 14 3	
Extension of Library Accommodation .		162 10 0	
Presidents and Treasurers Panels . .		45 0 0	
Miller Memorial Repairs		10 0 0	
William Curtis Portrait		80 0 0	3,445 2 8
Botanical Magazine		470 3 4	
Add Work in Advance		154 19 11	625 3 3
Carried forward . .			£45,782 17 10

FOR THE YEAR ENDED 31st DECEMBER, 1938. Cr.

	£	s.	d.	£	s.	d.
By Annual Subscriptions				53,508	9	11
,, Dividends and Interest	1,542	6	9			
,, Do. Do. Davis Trust . .	43	17	10			
,, Deposit Interest	141	9	5	1,727	14	0
,, Hall Lettings, Gross				5,529	5	6
,, Life Compositions—						
Being amounts paid by Fellows who have died during the year				288	15	0
,, Rent of Freehold Property (Wisley) .				286	12	11
Carried forward . .				£61,340	17	4

Dr. ANNUAL REVENUE & EXPENDITURE ACCOUNT

	£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				.	.		45,782	17	10
To EXAMINATIONS IN HORTICULTURE—									
Expenses				801	7	1			
Less Fees				749	9	0			
							51	18	1
,, GENERAL SCHOLARSHIPS				96	0	0			
Less Contribution from Knott Scholarship Fund . . .	30	0	0						
Less Contribution from Worshipful Company of Gardeners .	50	0	0						
				80	0	0			
							16	0	0
,, OLD AND NEW HALLS SINKING FUND APPROPRIATION							3,366	0	0
,, RESTAURANTS—									
Deficit after charging Proportion of Overhead Expenses							603	16	6
,, BALANCE, being Excess of Revenue over Expenditure, carried to General Reserve . .							11,520	4	11
							£61,340	17	4

	£	s.	d.
Brought forward . .	61,340	17	4
	£61,340	17	4

LIABILITIES.

	£	s.	d.	£	s.	d.
ACCUMULATED FUNDS ACCOUNT				250,000	0	0
LIFE COMPOSITIONS as at 31st December, 1937	15,335	5	0			
Less Fees paid by Fellows who have died during the year	288	15	0			
	15,046	10	0			
Add Life Compositions received during the year	714	0	0			
				15,760	10	0
SUNDRY CREDITORS				3,976	7	7
SUBSCRIPTIONS IN ADVANCE				537	13	8
DEPRECIATION AND RENEWALS FUND				10,000	0	0
OLD AND NEW HALLS SINKING FUND	26,175	16	7			
Deducted *per contra*	26,175	16	7			
WEATHER INSURANCE FUND				3,000	0	0
SUPPLEMENTARY PENSION FUND				4,589	3	2
DAME JULIA M. TILDEN LEGACY SUSPENSE ACCOUNT				500	0	0
MRS. A. C. CHARRINGTON LEGACY SUSPENSE ACCOUNT				500	0	0
MEMORIAL AND OTHER TRUST FUNDS—						
Balances of Income Accounts in the hands of the Society, as per Separate Schedule				342	3	4
GENERAL RESERVE—						
Balance as at 31st December, 1937	28,324	5	8			
Add Balance of Revenue and Expenditure Account, 31st December, 1938	11,520	4	11			
				39,844	10	7
				£329,050	8	4

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on the 31st December, 1938. In the total of Assets, £329,050 8*s*. 4*d*., are included Investments and Cash amounting in all to a total sum of £44,107 3*s*. 1*d*., representing Depreciation and other Funds.

BALANCE SHEET, 31st DECEMBER, 1938.

ASSETS.

	£	s.	d.	£	s.	d.
Old Hall, Offices, Restaurant, Library, and Equipment at Cost	77,642	0	0			
New Hall, Restaurant and Equipment at Cost	167,706	2	10			
	245,348	2	10			
Less Old and New Halls Sinking Fund *per contra*	26,175	16	7	219,172	6	3
Old and New Halls Sinking Fund Investments at Cost—						
As at 31st December, 1937	22,113	17	9			
Additions during the year	4,061	18	10	26,175	16	7
(Market Value at 30th December, 1938, £24,748 3s. 11d.)						
Freehold Property, Wisley—						
At Cost, *less* amounts written off				13,105	2	11
Botanical Magazine—						
Stock				100	0	0
Depreciation and Renewals Fund Investments at Cost				10,000	0	0
(Market value at 30th December, 1938, £9,878 17s. 3d.)						
Weather Insurance Fund Investments at Cost				3,000	0	0
(Market Value at 30th December, 1938, £2,763 7s. 3d.)						
Supplementary Pension Fund Investments at Cost—						
As at 31st December, 1937	4,175	5	4			
Additions during the year	413	17	10	4,589	3	2
(Market Value at 30th December, 1938, £4,269 2s. 0d						
Dame Julia M. Tilden Legacy Investment at Cost				500	0	0
(Market value at 30th December, 1938, £500 18s. 9d.)						
Mrs. A. C. Charrington Legacy Investment at Cost				500	0	0
(Market value at 30th December, 1938, £480 19s. 3d.)						
General Investments at Cost:						
As at 31st December, 1937	41,890	8	11			
Additions during the year	4,987	16	0	46,878	4	11
(Market value at 30th December, 1938, £44,796 14s. 7d.)						
Wisley Adjustment Account				272	14	10
Sundry Debtors and Payments in Advance				4,474	0	0
Cash at Bank and in Hand				282	19	8
				£329,050	8	4

J. S. FEATHER, F.C.A., *Auditor*
(Harper, Feather & Paterson, *Chartered Accountants*),
35 Great Tower Street, London, E.C. 3.

3rd January, 1939.

Dr. WISLEY GARDENS—REVENUE & EXPENDITURE

	£	s.	d.	£	s.	d.
To ESTABLISHMENT EXPENSES—						
Salaries and Wages	2,540	13	3			
Rates, Taxes and Insurances	454	5	10			
Miscellaneous, including Donations	1,154	15	2			
Annuities	91	0	0			
				4,240	14	3
,, LABORATORY AND SCHOOL OF HORTICULTURE—						
Salaries and Wages	2,660	4	10			
Miscellaneous	132	3	4			
Depreciation	57	0	1			
				2,849	8	3
,, GARDEN—						
Salaries and Wages	6,726	17	3			
Plant Distribution	993	11	8			
Miscellaneous	1,355	8	5			
Depreciation	312	15	2			
				9,388	12	6
,, STAFF PENSIONS	557	13	7			
Less Contributions by Staff, as per Scheme	278	17	0			
				278	16	7
				£16,757	11	7
To BALANCE, brought down				14,046	7	0
,, SPECIAL EXPENDITURE—						
Water Supply, Battleston Hill (balance of cost)	60	12	4			
Fencing	57	19	7			
Resurfacing Road	83	0	0			
Photography House	27	10	0			
				229	1	11
				£14,275	8	11

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1938. Cr.

	£	s.	d.	£	s.	d.
BY DIVIDENDS AND INTEREST				998	18	3
" CONTRIBUTIONS TO FRUIT TRIALS, 1937–8—						
Ministry of Agriculture	400	0	0			
Worshipful Company of Fruiterers . .	26	5	0			
				426	5	0
" GARDEN—						
Sales and Miscellaneous Receipts . .	297	9	6			
Prepaid Distribution, Postages and Packing Fees	988	11	10			
				1,286	1	4
" BALANCE, carried down				14,046	7	0
				£16,757	11	7
" BALANCE, being Net Expenditure for the Year, carried to the Annual Revenue and Expenditure Account				14,275	8	11
				£14,275	8	11

WISLEY GARDENS—BALANCE

LIABILITIES.

	£	s.	d.
Accumulated Funds Account	35,870	7	8
Vincent Square Adjustment Account	272	14	10
Endowment Trust Fund	24,479	14	3
Depreciation and Renewals Fund	9,185	7	0
	£69,808	3	9

SHEET, 31st DECEMBER, 1938.

ASSETS.

	£	s.	d.	£	s.	d.
LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., AT COST				33,371	10	10
N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.						
FUEL STOCK (valued by the Director) . . .				58	7	6
PLANT, LIVE STOCK AND LOOSE EFFECTS (valued by the Director)—						
As at 31st December, 1937	1,936	14	9			
Add Purchases during the year . . .	33	8	5			
	1,970	3	2			
Less Depreciation of Garden and Laboratory Effects	119	15	3			
				1,850	7	11
LIBRARY—						
As at 31st December, 1937	779	10	5			
Additions during the year	83	5	10			
				862	16	3
ENDOWMENT TRUST FUND INVESTMENTS AT COST .				24,479	14	3
(Market value at 30th December, 1938, £22,349 7*s.* 7*d.*)						
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST—						
As at 31st December, 1937	8,935	7	0			
Additions during the year	250	0	0			
				9,185	7	0
(Market value at 30th December, 1938, £9,820 11*s.* 3*d.*)						
				£69,808	3	9

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1938. In the total of Assets, £69,808 3*s.* 9*d.*, are included Investments, amounting to £33,665 1*s.* 3*d.*, representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., *Auditor*
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
35 Great Tower Street, London, E.C. 3.

3rd January, 1939.

	Amount of Fund represented by Investments at Cost. £	s.	d.	Income Balance to hand 31st Dec., 1937. £	s.	d.
1. ALFRED DAVIS TRUST FUND	1,049	9	2	*nil*		
2. WILLIAMS MEMORIAL FUND	258	15	4	13	11	0
3. MASTERS MEMORIAL FUND	542	17	0	122	5	10
4. NICHOLSON MEMORIAL FUND	202	2	2	*nil*		
5. SCHRÖDER PENSION FUND	557	14	6	6	6	8
6. LINDLEY LIBRARY TRUST	14,774	4	6 (*a*)	*nil*		
7. SIR JAMES KNOTT TRUST	600	0	0	97	9	3
8. VEITCH MEMORIAL TRUST FUND	1,746	1	0	61	18	2
9. MOORE MEDAL TRUST	190	10	6	4	19	1
10. SEWELL MEDAL TRUST FUND	531	8	9	1	12	2
11. MRS. SHERMAN HOYT PRIZE FUND	207	7	10	20	1	5
12. LORD RIDDELL TROPHY FUND	222	12	11	1	7	1
13. DEDICATIONS VOLUME FUND (Botanical Magazine)	221	5	6	*nil*		
14. THE COLMAN FUND	1,215	7	8	*nil*		
15. P. D. WILLIAMS FUND	372	7	9	11	11	11
16. THE GLAZEBROOK FUND	100	0	0	*nil*		

Notes on above Funds:

1. Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine.

2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals.

3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of one or more annual lectures.

4. Raised by donations in 1908 in memory of the late Mr. Geo. Nicholson to provide prizes for Wisley students.

5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benevolent Institution for one pension.

6. The nucleus of the library is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the books purchased by the Society and by the gifts of the late Mr. Reginald Cory and of private donors.

7. Presented to the Society in 1920 by the late Sir James Knott for the purpose of providing a scholarship tenable at Wisley.

FUND ACCOUNTS, 31st DECEMBER, 1938.

Dividends and Interest received during 1938.				Expenditure in 1938 in accordance with the Trust.			Income Balance in hands of R.H.S. 31st Dec., 1938.		
£	s.	d.		£	s.	d.	£	s.	d.
43	17	10		43	17	10		*nil*	
8	17	9		13	8	8	9	0	1
20	0	0		20	0	0	122	5	10
5	4	0		5	4	0		*nil*	
20	0	0		20	0	0	6	6	8
578	15	11	(*b*)	578	15	11		*nil*	
25	3	0		30	0	0	92	12	3
57	17	2		57	13	6	62	1	10
7	16	6		9	13	6	3	2	1
23	8	11		25	1	1		*nil*	
10	8	1		6	15	0	23	14	6
5	19	0		7	4	9		1	4
6	16	9	(*c*)	6	16	9		*nil*	
31	12	5	(*d*)	31	12	5		*nil*	
10	19	3		2	2	0	20	9	2
2	9	7			*nil*		2	9	7
Total as per Balance Sheet							£342	3	4

	£	s.	d.
(*a*) Investment .	1,509	10	2
Cost of books purchased by the Society up to 31st Dec., 1937	12,979	15	5
Books purchased by the Society in 1938 . .	284	18	11
	£14,774	4	6

(*b*) Includes contribution by the Society in 1938, £527 19*s.* 3*d.*

(*c*) Includes proceeds of sales in 1938, of £1. Invested and added to Fund.

(*d*) Invested and added to Fund.

8. Instituted in 1870 in commemoration of the late Mr. James Veitch for the encouragement of Horticulture. Fund vested in Society in 1922.

9. Presented to the Society in 1926 by the late Mr. G. F. Moore to provide a medal annually for the best new Cypripedium shown to the Society during the year.

10. Presented to the Society in 1928 by the late Mr. A. J. Sewell to provide medals for Rock Garden Plants.

11. Presented by Mrs. A. Sherman Hoyt in 1929 as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents.

12. Presented by the late Lord Riddell in 1931 to provide a trophy annually to be awarded for vegetables.

13. Proceeds of the sale of Curtis's Botanical Magazine Dedications, 1827–1927, presented in 1932 to the Society by the late Mr. William Cuthbertson, V.M.H., to be devoted to publications.

14. Presented to the Society in 1935 by Sir Jeremiah Colman, Bt., V.M.H., to be used for the improvement of flowers or fruit.

15. Raised in 1936 by donations to provide medals to commemorate the late Mr. P. D. Williams and to encourage the cultivation and improvement of Daffodils and Rhododendrons. In 1937 the Society made a grant of £75 to cover the cost of medal design and dies.

16. Bequeathed to the Society in 1938 by the late Mr. H. de T. Glazebrook to provide prizes at the Society's shows.

	Nominal.			Cost.		
	£	s.	d.	£	s.	d.
DEPRECIATION AND RENEWALS FUND, VINCENT SQUARE—						
Hertfordshire County Council, 3% Red. Stock, 1948–1953	1,107	7	0	1,076	9	8
Cornwall County Council, 3% Red. Stock, 1953–1963	1,107	7	0	1,056	8	8
Middlesex County Council, 3% Red. Stock, 1948–1953	830	10	3	799	6	3
Conversion Loan, 2½%, 1944–1949	2,768	7	5	2,580	16	11
Plymouth Corporation, 2¾% Red. Stock, 1918–1958	225	9	4	111	6	5
Funding Loan, 2½%, 1956–1961	2,559	0	5	2,396	2	6
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	2,036	12	10	1,979	9	7
	10,634	14	3	10,000	0	0
OLD AND NEW HALLS SINKING FUND—						
Hertfordshire County Council, 3% Red. Stock, 1948–1953	632	8	5	614	15	11
Cornwall County Council, 3% Red. Stock, 1953–1963	632	8	5	603	6	10
Middlesex County Council, 3% Red. Stock, 1948–1953	474	6	4	456	10	0
Conversion Loan, 2½%, 1944–1949	6,208	3	7	6,245	19	2
Funding Loan, 2½%, 1956–1961	13,416	15	6	12,505	12	4
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	5,915	14	5	5,749	12	4
	27,279	16	8	26,175	16	7
WEATHER INSURANCE FUND—						
Funding Loan, 2½%, 1956–1961	3,203	18	0	3,000	0	0
SUPPLEMENTARY PENSION FUND—						
Funding Loan, 2½%, 1956–1961	4,949	13	8	4,589	3	2
GENERAL INVESTMENTS—						
Hertfordshire County Council, 3% Red. Stock, 1948–1953	712	0	7	692	3	8
Cornwall County Council, 3% Red. Stock, 1953–1963	712	0	7	679	5	9
Middlesex County Council, 3% Red. Stock, 1948–1953	534	0	5	513	19	2
Conversion Loan, 2½%, 1944–1949	1,931	17	4	1,808	10	10
Funding Loan, 2½%, 1956–1961	21,287	4	8	20,088	9	8
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	8,284	2	6	8,097	13	10
National Defence Bonds, 2½%, 1944–1948	10,400	0	0	10,010	6	0
National Defence Bonds, 3%, 1954–1958	5,000	0	0	4,987	16	0
	48,861	6	1	46,878	4	11

OF INVESTMENTS, 31st DECEMBER, 1938.

	Nominal.			Cost.		
	£	s.	d.	£	s.	d.
Wisley Endowment Trust Fund—						
Hertfordshire County Council, 3% Red. Stock, 1948–1953	1,041	4	3	1,012	3	11
Cornwall County Council, 3% Red. Stock, 1953–1963	1,041	4	3	993	6	9
Middlesex County Council, 3% Red. Stock, 1948–1953	780	18	2	751	11	5
Conversion Loan, 2½%, 1944–1949	2,824	2	3	2,654	14	1
Metropolitan Cons. 2½% Stock, 1919–1949	970	0	0	499	12	0
Plymouth Corporation, 6% Red. Stock, 1940–1950	30	9	4	29	6	4
Plymouth Corporation, 2¾% Red. Stock, 1918–1958	400	0	0	197	1	0
Bristol Corporation, 2½% Red. Deb. Stock	600	0	0	278	18	6
Canadian Pacific, 4% Perp. Cons. Deb. Stock	4,632	0	0	3,890	17	6
Buenos Ayres Gt. Southern Railway, 5% Non-Cum. Pref. Stock	2,500	0	0	2,825	0	0
Funding Loan, 2½%, 1956–1961	9,959	13	9	9,333	3	3
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	2,072	2	9	2,013	19	6
	26,851	14	9	24,479	14	3
Depreciation and Renewals Fund, Wisley—						
Hertfordshire County Council, 3% Red. Stock, 1948–1953	506	19	9	492	17	2
Cornwall County Council, 3% Red. Stock, 1953–1963	506	19	9	483	13	7
Middlesex County Council, 3% Red. Stock, 1948–1953	380	4	10	365	19	2
Conversion Loan, 2½%, 1944–1949	1,267	9	5	1,181	12	4
Metropolitan Consolidated 2½% Stock, 1919–1949	1,287	9	2	662	19	3
Plymouth Corporation, 2¾% Red. Stock, 1918–1958	288	8	10	142	1	0
Plymouth Corporation, 6% Red. Stock, 1940–1950	159	18	4	151	12	4
Bristol Corporation, 2½% Red. Deb. Stock	795	14	6	369	15	3
Funding Loan, 2½%, 1956–1961	4,392	9	6	4,090	11	4
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	1,280	4	3	1,244	5	7
	10,865	18	4	9,185	7	0
Alfred Davis Trust Fund—						
Metropolitan Consolidated 2½% Stock, 1919–1949	610	0	0	314	4	0
Plymouth Corporation, 2¾% Red. Stock, 1918–1958	200	0	0	98	10	6
Plymouth Corporation, 6% Red. Stock, 1940–1950	32	7	4	31	2	3
Bristol Corporation, 2½% Red. Deb. Stock	400	0	0	186	3	6
Funding Loan, 2½%, 1956–1961	447	19	6	419	8	11
	1,690	6	10	1,049	9	2
Williams Memorial Fund—						
East Indian Railway £7 Annuity, Class "B," 1953	168	0	0	168	0	0
Funding Loan, 2½%, 1956–1961	56	6	7	52	15	1
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	39	2	2	38	0	3
	263	8	9	258	15	4

SCHEDULE OF INVESTMENTS, 31st DECEMBER, 1938.

	Nominal.			Cost.		
	£	s.	d.	£	s.	d.
Masters Memorial Fund—						
L.M.S. Railway, 4% Preference Stock . .	250	0	0	290	13	6
„ „ 4% Guaranteed Stock .	250	0	0	252	3	6
	500	0	0	542	17	0
Nicholson Memorial Fund—						
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	207	18	11	202	2	2
Schröder Pension Fund—						
Great Western Railway, 4% Deb. Stock .	500	0	0	557	14	6
Lindley Library Trust Fund—						
L.M.S. Railway, 4% Pref. Stock	1,137	0	0	1,458	15	7
Funding Loan, 2½%, 1956–1961	54	3	7	50	14	7
	1,191	3	7	1,509	10	2
Sir James Knott Trust Fund—						
Agricultural Mortgage Corporation, Ltd., 4½% Deb. Stock	558	19	5	600	0	0
Veitch Memorial Trust Fund—						
Government of Australia 3½% Reg. Stock, 1954–1959	1,354	0	1	1,354	0	1
Funding Loan, 2½%, 1956–1961	418	14	0	392	0	11
	1,772	14	1	1,746	1	0
Moore Medal Trust Fund—						
Agricultural Mortgage Corporation, Ltd., 4½% Deb. Stock	173	19	8	190	10	6
Sewell Medal Trust Fund—						
Conversion Loan, 5%, 1944–1964 . .	401	5	7	400	0	0
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	135	4	8	131	8	9
	536	10	3	531	8	9
Mrs. Sherman Hoyt Prize Fund—						
Conversion Loan, 5%, 1944–1964 . .	208	1	2	207	7	10
Lord Riddell Trophy Fund—						
Funding Loan, 2½%, 1956–1961	237	15	8	222	12	11
Dedications Volume Fund (Botanical Magazine)—						
Railway Clearing House, Freight Rebates Fund, 2½% Red. Stock, 1937–1952	28	17	6	28	1	3
Funding Loan, 2½%, 1956–1961	207	5	8	193	4	3
	236	3	2	221	5	6
The Colman Fund—						
Funding Loan, 2½%, 1956–1961	1,300	17	0	1,215	7	8
P. D. Williams Fund—						
2½% Consols	439	4	6	372	7	9
H. de T. Glazebrook Prize Fund—						
2½% Consols	132	6	0	100	0	0
Dame Julia M. Tilden Legacy—						
2½% Conversion Stock, 1944–1949 . . .	527	6	1	500	0	0
Mrs. A. C. Charrington Legacy—						
2½% Conversion Stock, 1944–1949 . . .	506	5	6	500	0	0

GENERAL MEETINGS.

November 8, 1938.

Flower Arrangement Competition.

First Prize, a Silver Cup.
To Mrs. E. Eades Vessell, 6 Devonshire Place, W. 1.

Second Prize, £1 10s.
To Mrs. E. Hunter, 187 Queen's Gate, London, S.W. 7.

Third Prize, £1.
To Miss N. Mitchell, Bledlow Ridge, High Wycombe.

Silver-gilt Grenfell Medal.
To Miss Hilda F. M. Wright, Perth, Australia, for an exhibit of Water-coloured Photographs of Australian Wild Flowers.

Silver Grenfell Medal.
To Miss C. B. Watts, Edinburgh, for an exhibit of Pen-and-Ink and Water-colour Drawings of Plants.

Grenfell Medal.
To Mr. A. G. Stubbs, Hove, for an exhibit of Drawings of Plants, Fruits and Insects.

To Miss I. M. Charters, Leicester, for an exhibit of Pen-and-Ink Drawings and Water-colour Paintings of Flowers.

The Second Masters Memorial Lecture, 1938, was given by Mr. F. J. Chittenden, F.L.S., V.M.H., on "The Behaviour of Plants." Chairman, The Lord Aberconway, C.B.E., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Plants for identification.—Plants referred from Floral Committee B were identified as *Myrtus Ugni* with fruits not quite ripe, from Lady Rockley; and a species of Paullinia probably of the *Enourea* section from Messrs. L. R. Russell of Windlesham.

Damage to Fern spores.—Mr. Robinson showed damaged ferns the spores of which had been sown on sterilized soil. These were referred to Mr. G. F. Wilson for examination.

Dwarf plants of Campanula glomerata.—Professor Weiss showed a dwarf form of *Campanula glomerata* which has been called var. *acaulis* collected by him from downland in the Isle of Wight. It is not known whether the form is permanent.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. Bunyard, F.L.S., in the Chair, and fifteen other members present.

Exhibits.

Lady Leconfield, Petworth Park, Petworth: Pears 'Beurré Baltet père' and 'Passe Crasanne.'

Messrs. Stuart Low, Bush Hill Park, Enfield: Pear 'Packham's Triumph.'

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:

Gold Medal.
To J. Pierpont Morgan, Esq. (gr. Mr. F. A. Steward), Watford, for Begonias, Gesnerias, and other greenhouse plants.

To Messrs. Sutton, Reading, for Cyclamen.

Silver-gilt Flora Medal.
To Messrs. Wells, Merstham, for Chrysanthemums.

Silver Flora Medal.
To Messrs. Vinten, Balcombe, for Chrysanthemums.

Flora Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.

Banksian Medal.
To Messrs. Carlile, Twyford, for herbaceous plants.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Messrs. Gibson (Cranleigh), for Chrysanthemums.
To Messrs. S. Low, Enfield, for Carnations.
To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.
To Messrs. Prior, Colchester, for Roses.

Award of Merit.
To *Hippeastrum* ' Snow White ' as a greenhouse flowering plant (votes unanimous), from R. F. W. Cartwright, Esq. (gr. Mr. E. Humphris), Banbury. See p. 89.

Other Exhibits.
Messrs. Barr, London : Chrysanthemums.
Messrs. Clark, Dover : hardy plants.
A. Langley Smith, Esq., Catford : Pelargonium ' Permanent Wave.'
J. Smith, Esq., Lower Edmonton : Chrysanthemum ' Lionel Bugg.'
Messrs. Vinten, Balcombe : Chrysanthemum ' White Avondale.'

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver Banksian Medal.
To Mr. E. Ladhams, Elstead, for ornamental foliage and berried shrubs.
To Messrs. Russell, Windlesham, for Clematis, Vitis and other shrubs.

Banksian Medal.
To Messrs. Burkwood & Skipwith, Kingston, for flowering shrubs.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Messrs. Jackman, Woking, for Clematis and other shrubs.
To Mr. J. Klinkert, Richmond, for clipped Box trees.
To Messrs. Southgate, New Malden, for succulents.

Award of Merit.
To *Cosmos atrosanguineus* as a hardy flowering plant (votes unanimous), from Messrs. Treseder, Truro. See p. 88.

Preliminary Commendation.
To *Camellia* 'fragrans' as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross.

Other Exhibits.
T. A. Howse Crompton, Esq., Ardingley : *Rhododendron ponticum* flowering out of season.
Mrs. Hopkinson, Coulsdon : rock garden plants.
The Lady Rockley, C.B.E., Poole : *Myrtus Ugni.*
Messrs. Russell, Windlesham : *Begonia* ' Richmond Gem,' *Paullinia sp.*
The Rt. Hon. Lord Swaythling, Southampton : *Lilium ochraceum* var. *burmanicum* (F.C.C. 1888).
O. E. P. Wyatt, Esq., Northampton : *Berberis Geraldii.*

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bt., in the Chair, and nine other members present.

Award Recommended :—

Lindley Medal.
To R. F. W. Cartwright, Esq., Aynho Park, Banbury (gr. Mr. E. Humphris), for three exceptionally fine specimens of *Cattleya* × ' Portia ' bearing 61, 62 and 65 flowers respectively.

Other Exhibit.
Messrs. McBean, Cooksbridge : a group of Orchids.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. F. C. STERN, F.L.S., in the Chair, and four other members present.

There was no business before the Committee on this occasion.

NOVEMBER 29, 1938.

Grenfell Medal.

To Miss E. Canziana, 3, Palace Green, W. 8, for an exhibit of Water-colour Paintings of Gardens.

To Miss G. Thomasset, 11, St. Mildred's Road, Lee, S.E. 12, for an exhibit of Water-colour Paintings of Flowers.

A lecture was given by Dr. M. A. H. Tincker, M.A., D.Sc., F.L.S., on "Growth Substances and Horticultural Practice."

Chairman, Prof. F. E. Weiss, D.Sc., LL.D., F.R.S., F.L.S.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Damage to Fern Spores.—Mr. G. F. Wilson reported that two fungus gnat (Mycetophilid) larvæ were found among the fern spores shown at the last meeting. Several species of the Sciarid flies are normal inhabitants of glasshouses where the larvæ generally feed upon decaying matter. One species, however, *Sciara pectorales* is known as a pest in orchid houses feeding on seedlings and encouraged by the presence of moss in the pots.

Potato tubers growing inside old tubers.—The Hon. Lewis Palmer showed a tuber of potato which had sent a shoot from a bud on the tuber into the parent tuber and there produced other tubers. The parent tuber was from the 1937 crop, and had not been planted.

Apple pollination.—Mr. C. H. Hooper described his experiments in apple pollination during the past year and among them attention was drawn to the free setting of 'Red Cox's Orange' with pollen of 'Lord Lambourne' and to the failure to fruit of bagged clusters (not pollinated by hand) of 'Crawley Beauty,' although open clusters set freely in spite of the absence of other varieties in flower at the same time.

FRUIT AND VEGETABLES COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present.

The business of the Committee consisted of the identification of fruits.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Gold Medal.

To Baron Bruno Schröder, Englefield Green (gr. Mr. F. A. Bush, N.D.H.), for Begonias.

Silver-gilt Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

Silver-gilt Banksian Medal.

To Mr. H. Woolman, Birmingham, for Chrysanthemums.

Silver Flora Medal.

To Messrs. Engelmann, Saffron Walden, Anemone-flowered and Pompon Chrysanthemums.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Cyclamen.

To Messrs. Greenyer, Worthing, for Chrysanthemums.

To Napsbury Mental Hospital, St. Albans (gr. Mr. W. J. Jennings), for Cyclamen.

To Messrs. Vinten, Balcombe, for Chrysanthemums.

To Messrs. Wells, Merstham, for Chrysanthemums.

Banksian Medal.

To Mr. W. Yandell, Maidenhead, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'E. F. Hawes' as a variety for exhibition (votes unanimous), from Messrs. Luxford, Sawbridgeworth. See p. 88.

To Chrysanthemum 'Duchess of Kent' as a variety for exhibition (votes unanimous), from Mr. H. Woolman, Shirley, Birmingham. See p. 88.

Preliminary Commendation.

To Chrysanthemum 'Gracie Fields' from Mr. R. Paine, Partwick Nursery, Henfield, Sussex.

Other Exhibits.

Mr. T. Allen, Glynde : Chrysanthemum 'Pink Antique.'

Messrs. Clark, Dover : Pansies.

Mr. W. H. Cole, Southampton : Chrysanthemums 'Bronze Favourite' and 'Imperial Favourite.'

Mr. E. T. P. Goodyear, Reigate Heath : Chrysanthemum 'Ischo Kayan.'

Mr. W. J. Jennings, St. Albans : Chrysanthemum 'Napsbury Bronze.'

Mr. R. Paine, Henfield : Chrysanthemum 'Golden Ray.'

Mr. J. B. Stevenson, Hillingdon : Chrysanthemum 'Columbus Dispatch.'

Sussex Nurseries Ltd., Rustington : Chrysanthemum 'Snow White.'

Mr. H. Woolman, Birmingham : Chrysanthemums 'George Garner,' 'Harry Hibbs,' 'R. J. Miflin,' 'Shirley Radiance.'

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, for dwarf rock-garden shrubs.

Flora Medal.

To Messrs. Russell, Windlesham, for evergreen shrubs and Azaleas.

Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for succulents.

To Messrs. Jackman, Woking, for evergreen shrubs.

To Messrs. Southgate, New Malden, for succulents.

To W. G. Theobald, Esq., Steyning, for Cotyledons and Echeverias.

Award of Merit.

To *Crocus laevigatus albus* as a hardy flowering plant (votes unanimous), from G. P. Baker, Esq., Sevenoaks. See p. 88.

To *Ornithogalum Saundersiae* as a flowering plant for the cool greenhouse (votes 11 for), from Lionel de Rothschild, Esq., Exbury. See p. 89.

Preliminary Commendation.

To *Euonymus Sargentianus* as a hardy ornamental-fruiting shrub (votes unanimous), from W. Butt, Esq., Chalford.

Other Exhibits.

Messrs. Burkwood & Skipworth, Kingston : evergreen shrubs.

Col. C. H. Grey, Cranbrook ; *Crocus laevigatus Fontenayi, Iris Vartani.*

Mrs. Hopkinson, Couldson : rock garden plants.

Mr. J. Klinkert : clipped trees.

Messrs. Russell, Windlesham : *Piper Betle.*

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and seventeen other members present.

Awards Recommended :—

Award of Merit.

To *Cypripedium* × 'Wendover' ('Atlantis' × 'John Henry') (votes 11 for, 4 against), from H. Bernard Hankey, Esq., East Burnham Park, Bucks. See p. 88.

To *Denrobium* × 'Louis Bleriot' var. 'Illustrious' (*Phalaenopsis* var. *Schroederianum* × *superbiens*), (votes 15 for, 4 against), from Messrs. Sanders, St. Albans. See p. 88.

Cultural Commendation.

To Messrs. Sanders, St. Albans, for *Dendrobium* × 'Louis Bleriot' var. 'Illustrious,' a vigorous plant with three many-flowered spikes.

Banksian Medal.

To the Napsbury Mental Hospital, St. Albans (gr. Mr. W. J. Jennings), for a group of *Calanthe* hybrids.

Other Exhibits.

Messrs. H. G. Alexander, Tetbury, Glos. : a group of Orchids.

Messrs. Charlesworth, Haywards Heath : a group of Orchids.

Messrs. Sanders, St. Albans : a group of Orchids.

Messrs. Stuart Low, Jarvis Brook : a group of Orchids.

Messrs. J. & A. McBean, Cooksbridge : a group of Orchids.

Geo. Punnett, Esq., Crockham Hill, Kent : *Cypripedium* × 'Thumbelisa.'

Ralph Bates, Esq., Purdown House, Stapledon, Bristol : *Cypripedium* × 'Adrienne' ('Dante' × 'Lucernale.')

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and ten other members present.

Awards Recommended :—

Award of Merit.

To Carnation 'Royal Salmon' (votes unanimous), shown by Messrs. Allwood Bros., Haywards Heath, Sussex. See p. 88.

Other Exhibits.

Messrs. Allwood Bros., Haywards Heath, Sussex : Carnations 'Royal Beauty,' 'Afterglow,' 'Sir Harry Brittain,' 'Maytime' (to be seen again), 'Royal Chintz' (to be seen again), 'Freckles.'

Messrs. C. Engelmann, Saffron Walden, Essex : Carnations 'Chloe' and 'Moidore' (both to be seen again).

Messrs. Stuart Low, Enfield, Middlesex : Carnations 'Ash Grove' and 'Neville Chamberlain.'

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and five other members present.

Award Recommended :—

Preliminary Commendation.

To *Gentiana* sp. (G. Sherriff 2912) (votes unanimous), from Col. Stephenson R. Clarke, Haywards Heath, Sussex.

DECEMBER 13, 1938.

Grenfell Medal.

To Miss W. M. A. Brooke, 300, Philip Lane, N. 15, for an exhibit of Water-colour and Pencil Drawings of Plants from South Africa and Basutoland.

To Miss H. M. Coley, Sweetbriars, Langton Matravers, nr. Swanage, for an exhibit of Water-colour Paintings of Flowers.

To Miss E. Sartain, Rosemary, Fairlight Avenue, Telscombe Cliffs, Sussex, for an exhibit of Water-colour Paintings of Flowers.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Cleistogamous flowers in *Primula stricta* produced both under glass and in the open were sent by Mr. Streeter from the Gardens, Petworth Park, Sussex.

Twitch stolons penetrating a small rubber ball found in digging were shown. Several stolons had passed through from side to side as may at times be seen through a potato tuber. The supposition that an enzyme acts in dissolving cells in the way of passage would not explain the penetration in the present instance, pressure behind the sharp end of the stolon alone acting.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Award Recommended :—

Cultural Commendation.

To Mr. Howard H. Crane, Highmead, Eastcote, Pinner, for fruits of Apple 'Laxton's Superb.'

Other Exhibits.

Mr. E. A. Bunyard, Allington, Maidstone : Apples 'Blenheim Orange' and 'Braddick's Nonpareil.'

The Marchioness of Londonderry, Wynyard Park, Billingham-on-Tees : Apple 'Calville Blanche d'Hiver.'

FLORAL COMMITTEE A.—Mr. W. R. OLDHAM, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Chrysanthemums.

To Messrs. Vinten, Balcombe, for Chrysanthemums.

Flora Medal.

To Messrs. Greenyer, Worthing, for Chrysanthemums.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Low, Enfield, for Carnations.
To Messrs. Napier, Taunton, for Carnations.
To Mr. W. Yandell, Maidenhead, for Chrysanthemums.

Other Exhibits.

Hon. Mrs. Alan Gardner, Worplesdon : ornamental Gourds.
Mr. J. H. High, Ayr : Chrysanthemum 'Wattfield Favourite.'
Mr. F. G. Knapton, Ardleigh : Chrysanthemums.
Mrs. M. C. Lester, Horsted Keynes : Chrysanthemum 'Mrs. M. C. Lester.'
Hon. Mrs. Neame, Faversham : Chrysanthemums.
Messrs. Sherratts, Burton-on-Trent : Chrysanthemum 'Triumph.'
Mr. J. B. Stevenson, Hillingdon : Chrysanthemums 'Columbus Dispatch' and 'Mrs. A. J. Stahelin.'

FLORAL COMMITTEE B.—Mr. C. T. Musgrave, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Sutton, Reading, for *Lilium longiflorum* from St. Helena bulbs..

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, for shrubs and rock-garden plants.

Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Euphorbias.
To Messrs. Jackman, Woking, for evergreen and flowering shrubs.
To Messrs. Russell, Windlesham, for evergreen and flowering shrubs.

Banksian Medal.

To Brookside Nurseries, Oxford, for dwarf shrubs.
To Messrs. Burkwood & Skipwith, Kingston, for evergreen shrubs.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Mr. J. Klinkert, Richmond, for clipped trees.
To Mr. L. Lawrence, Taplow, for succulents.
To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.
To Messrs. Perry, Enfield, for hardy ferns.
To Messrs. Southgate, New Malden, for succulents.

Award of Merit.

To *Luculia gratissima* as a flowering plant for the cool greenhouse (votes unanimous), from Messrs. Russell, Windlesham. See p. 89.

Preliminary Commendation.

To *Coleus Autrani* as a flowering plant for the greenhouse (votes unanimous), from the Director, Royal Botanic Gardens, Kew.

Other Exhibits.

Messrs. Baggesen, Pembury : Hollies and Veronicas.
Mr. W. Bates, Wokingham : *Prunus subhirtella autumnalis rosea.*
Messrs. Clark, Dover : dwarf shrubs.
Combe Gardens, Honiton : shrubs and herbaceous plants.
Messrs. Gill, Penryn : *Cornus capitata.*
Mrs. Hopkinson, Coulsdon : rock-garden plants.
Messrs. Neale, Worthing : succulents.
L. de Rothschild, Esq., Exbury : *Zantedeschia* 'June.'

ORCHID COMMITTEE.—Sir Jeremiah Colman, Bart., in the Chair, and seventeen other members present.

Awards Recommended :

Award of Merit.

To *Cypripedium* × 'Hazel Hankey,' East Burnham var. ('Hesketh' × 'Mrs. Marling') (votes 13 for), from H. Barnard-Hankey, Esq., East Burnham Park, Bucks. See p. 88.

Cultural Commendation.

To Mr. B. White, Orchid grower to H. Barnard-Hankey, Esq., East Burnham Park, Bucks, for a well-grown plant of *Angraecum distichum.*

Other Exhibits.

Messrs. Charlesworth, Haywards Heath : a group of Orchids.
Messrs. Stuart Low, Jarvis Brook : a group of Orchids.
Messrs. H. G. Alexander, Tetbury : a group of Orchids.

Messrs. Black & Flory, Slough: a group of Orchids.

Sir William Booke, Bart., Hampstead Norris: *Cymbidium* × 'Dabchick.'

Dr. Frank T. Paul, Grayshott, Surrey: *Lycaste* × *Lucianii.*

H. P. Lawson, Esq., Knaphill, Surrey: *Cypripedium* × 'Golden Emblem.'

W. F. Higgins, Esq., Croydon: *Rhipidoglossum rutilum*, collected at Fort Portal, Uganda.

Messrs. C. S. & J. W. Browning, Cheam, Surrey: *Cypripedium* × 'Annie Browning.'

Messrs. Armstrong & Brown, Tunbridge Wells: *Cypripedium* × 'Nymph.'

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. GEO. MONRO, V.M.H., in the Chair, and nine other members present.

Exhibits.

Messrs. Allwood Bros., Wivelsfield Nurseries, Haywards Heath, Sussex: Carnations 'Sir Harry Brittain' and 'Freckles.'

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and three other members present.

There was no business before the Committee on this occasion.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

JANUARY 10, 1939.

CYPRIPEDIUM TROPHY COMPETITION.

The Cypripedium Trophy for the best exhibit of twenty-five plants of Cypripedium, species and/or hybrids, shown by an amateur, was awarded to M. L. Wells, Esq., Chiddingfold, Surrey. (Gardener: Mr. R. Buckman.)

Silver Grenfell Medal.

To Mr. A. G. Stubbs, Hove, Sussex, for an exhibit of water-colour paintings of plants.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Mistletoe seedlings.—The question of the best way to establish Mistletoe was raised, and it was concluded that sowing of seed which had not been allowed to become dry, not before the end of February, close to a sappy shoot preferably of the current year, gave the best chance of success, the west side of the shoot being better than the east.

Persistent Holly berries.—Miss Armitage of Dadnor, Ross, sent specimens of berries from a tree in her garden on which they persisted long after birds had denuded neighbouring ones. She thought them not quite so bright, nor quite as large as those of trees more readily stripped. Mr. Chittenden said there was at Wisley a tree on which the berries remained for a full year as a rule, and he thought these berries not noticeably smaller than those of neighbouring Hollies. The explanation of their immunity from attack lay perhaps in some difference in flavour.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and sixteen other members present.

Award Recommended :—

Silver Hogg Medal.

To Messrs. Bunyard, Maidstone, for collection of Apples.

Other Exhibits.

Mr. H. Barnett, Westwood House, Tilehurst, Berks: samples of Medlar and Quince Jelly.

Mr. E. A. Bunyard, Allington, Maidstone: Apples 'Baxter's Pearmain,' 'Claygate Pearmain,' 'Maltster,' 'Old Royal Russet' and 'Sanspareil.'

Mr. C. G. A. Nix, Tilgate, Crawley, Sussex: Apple 'Laxton's Superb' and Pear 'Josephine de Malines.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Engelmann, Saffron Walden, for Carnations, Euphorbias and Pansies.

To Messrs. Vinten, Balcombe, for Chrysanthemums.

Banksian Medal.
To Messrs. Low, Enfield, for Carnations.
To Messrs. Napier, Taunton, for Carnations.
Cultural Commendation.
To Mr. C. E. Taylor (gardener to Mrs. S. H. Whitbread), Southill Park, Biggleswade, for climbing Rose 'La Follette.'

Other Exhibit.
Messrs. Sutton, Reading: Primulas.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—
Silver Flora Medal.
To Messrs. Russell, Windlesham, for greenhouse flowering and foliage plants.
Silver Banksian Medal.
To Mr. E. Ladhams, Elstead, for rock-garden shrubs and plants.
Flora Medal.
To Messrs. Cheal, Crawley, for flowering and evergreen shrubs.
To Messrs. Stewart, Ferndown, for shrubs and bulbous plants.
Banksian Medal.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Messrs. Jackman, Woking, for evergreen shrubs.
To Messrs. Klinkert, Richmond, for clipped trees.
To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.

Other Exhibits.
Alpine Nurseries, West Moors: shrubs and alpine plants.
Messrs. Barr, Taplow: bulbous plants.
Brookside Nurseries, Oxford: dwarf shrubs.
The Viscountess Byng of Vimy, Thorpe-le-Soken: *Lachenalia pendula Boundii.*
R. C. Mitchison, Esq., Wootton: *Iris palestina, Smilax aspera.*
Messrs. Russell, Windlesham: *Rondeletia cordata, Rhododendron javanicum* var.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bt., V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—
Silver-gilt Flora Medal.
To Messrs. H. G. Alexander, Tetbury, for a group of Cypripediums.
To Dr. F. Craven Moore, East Grinstead, for a group of Cypripediums.
To Messrs. Black & Flory, Slough, for a group of Cypripediums.
Silver Banksian Medal.
To Messrs. Charlesworth, Haywards Heath, for a group of Orchids.
To Messrs. Armstrong & Brown, Tunbridge Wells, for a group of Orchids.
To Messrs. McBean, Cooksbridge, for a group of Orchids.
To Messrs. Stuart Low, Jarvis Brook, for a group of Orchids.
First-class Certificate.
To *Cymbidium* × 'Rio-Rita' var. 'Radiant' ('Pearl' × 'Ruby') (votes 15 for), from Messrs. McBean. See p. 137.
Award of Merit.
To *Cypripedium* × 'Akeley,' East Burnham var. ('Grace Darling' × 'Josette') (votes 16 for), from H. Barnard Hankey, Esq., East Burnham Park, Bucks. See p. 137.
To *Cypripedium* × 'Helen P. Dane' ('Grace Darling' × 'Lady Chesham') (votes 15 for), from Messrs. Black & Flory, Slough. See p. 137.

Other Exhibits.
Messrs. H. Dixon, Wandsworth: a group of Orchids.
Messrs. A. J. Keeling, Bradford: a group of Cypripediums.
C. P. Harben, Esq., Totton, Hants: *Cymbidium* × 'Cremona.'
M. L. Wells, Esq., Chiddingfold: *Cypripedium* hybrids.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN, O.B.E., M.C., F.L.S., in the Chair, and six other members present.

Exhibit.
Messrs. D. Stewart, Ferndown, Dorset: the Japanese *Eranthis pinnatifida.*

JANUARY 24, 1939.

Silver Grenfell Medal.

To Miss Madge Fawkes, Black Bourton, Oxford, for an exhibit of water-colour and oil paintings of wild flowers of Basutoland.

A lecture was given by Mr. A. J. COBB on "Dahlias." Chairman, Mr. J. B. RIDING.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Violets with spotted foliage.—Foliage of violets grown in a frame were shown which Mr. Green reported were attacked by the fungus *Ascochyta Violae*, usually most abundant where ventilation was inadequate, or the plants too close in the frame.

Tulip seeds with sclerotia.—Mr. Green showed seeds of *Tulipa Kaufmanniana* which bore many sclerotia of the fungus of Tulip-fire disease. They had failed to germinate and it was found that the embryo had been completely destroyed. The seed had been saved last summer.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and sixteen other members present.

Award Recommended :—

Silver Knightian Medal.

To Messrs. Sutton, Reading, for an exhibit of vegetables.

Other Exhibits.

Mr. E. A. Bunyard, Allington, Maidstone : Apple ' Belle de Boskoop.'
Mr. R. Carrington Willis, Bedlow Ridge, Bucks : Apple ' Willis Seedling.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Engelmann, Saffron Walden, for Carnations.

Silver Banksian Medal.

To Capt. G. S. Brocklebank (gr. Mr. J. T. Boulton), Flimwell, for *Primula malacoides*.
To Messrs. Carters Tested Seeds, Raynes Park, for Primulas.

Flora Medal.

To Ashington Nurseries, Ashington, for Carnations.

Banksian Medal.

To Messrs. Low, Enfield, for Carnations.
To Messrs. Napier, Taunton, for Carnations.

Selected for trial at Wisley.

Primula malacoides ' Alice Baines,' from Messrs. T. & G. W. Baines, Hextable, Swanley, Kent.
Primula sinensis ' Giant Dazzler,' from Messrs. Brooks, Worting, Basingstoke.

Award recommended after trial at Wisley.

Award of Merit.

To *Primula sinensis* ' Queen of the Pinks,' from Messrs. Sutton, Reading. See p. 138.

Other Exhibits.

Messrs. Bath, Wisbech : Daffodils and Hyacinths.
Messrs. Wakeley, London : Hyacinths, Crocuses, etc.
Mr. F. L. White, Polegate : turf and alpine plants.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, for rock-garden plants and shrubs.
To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.

Flora Medal.

To Messrs. Cheal, Crawley, for flowering shrubs.

To Hocker Edge Gardens, Cranbrook, for Crocuses, Freesias and other bulbous plants.

To Messrs. Russell, Windlesham, for flowering shrubs.

To Messrs. Stewart, Ferndown, for rock-garden plants and shrubs.

Banksian Medal.

To Messrs. Barr, Taplow, for Narcissi, Irises and other bulbous plants.

To Mr. K. W. Harle, Lower Basildon, for succulents.

To Messrs. Hillier, Winchester, for evergreen and flowering shrubs.

To Messrs. Jackman, Woking, for evergreen shrubs.

To Mr. J. Klinkert, Richmond, for clipped trees.

To Messrs. Prichard, Christchurch, for rock-garden plants.

To Messrs. Waterer, Twyford, for bulbous plants.

To Messrs. Wood, Taplow, for rock-garden plants and shrubs.

Award of Merit.

To *Philageria* × *Veitchii* as a flowering plant for the cool house or for sheltered positions in the open (votes 10 for, 1 against), from Sir John F. Ramsden, Bt., Gerrards Cross. See p. 137.

Other Exhibits.

Alpine Nurseries, West Moors : bulbous plants.

Messrs. Burkwood & Skipwith, Kingston : dwarf shrubs.

Messrs. Gurteen & Ritson, Horley : shrubs.

Mrs. K. Hopkinson, Coulsdon · rock-garden plants.

L. de Rothschild, Esq., Exbury : *Arum Dioscoridis* var. *spectabile.*

Messrs. Treseder, Truro : *Eupatorium vernale.*

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bt., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

First-class Certificate.

To *Lycaste* × 'Sir Jeremiah Colman' (*lanipes* × *Skinneri alba magnifica*) (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. See p. 137.

Award of Merit.

To *Cypripedium* × 'Green Dragon' ('Grace Darling' × 'Walter Moore') (votes 11 for, 1 against), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 137.

Cultural Commendation.

To Messrs. Stuart Low, Jarvis Brook, for *Odontioda* × 'Selborne,' a robust plant bearing exactly 100 flowers.

Other Exhibits.

Messrs. Armstrong & Brown, Tunbridge Wells : a group of Orchids.

Messrs. Sanders, St. Albans : a group of Orchids.

Messrs. H. G. Alexander, Tetbury : a group of Orchids.

Messrs. Charlesworth, Haywards Heath : a group of Orchids.

Messrs. McBean, Cooksbridge : a group of Orchids.

Messrs. Stuart Low, Jarvis Brook : a group of Orchids.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and five other members present.

There was no business before the Committee on this occasion.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

FEBRUARY 7, 1939.

Silver-gilt Grenfell Medal.

To Miss Winifred Walker, 106 Marine Parade, Worthing, for an exhibit of water-colour paintings of Flowers of Shakespeare.

Grenfell Medal.

To Mr. A. G. Stubbs, Hove, Sussex, for an exhibit of water-colour paintings of Flowers and Shrubs.

A lecture was given by Mr. R. E. HAY on "Colour in Rock and Woodland Gardens." Chairman, The Viscountess BYNG OF VIMY. See p. 175.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Seeds of Spathodea nilotica with transparent glabrous wings were shown by Dr. Tincker. This member of the Bignoniaceae is a common tree in tropical Africa.

Many specimens for naming were received.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present.

Exhibits.

Mr. E. A. Bunyard, Allington, Maidstone: Apple 'Reinette Zuccamaglio.'

Imperial Fruit Show, Ltd.: exhibit of Palestine and South African Fruits in season.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. Blackmore & Langdon, Bath, for Cyclamens.

Silver Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, *Euphorbia fulgens*, Pansies.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Bath, Wisbech, for Hyacinths, Crocuses and Daffodils.

To Messrs. Carter, Raynes Park, for exhibit of *Primula malacoides*.

Flora Medal.

To Messrs. Sutton, Reading, for *Primula malacoides*.

Banksian Medal.

To Ashington Nurseries, Ashington, for Carnations.

To Messrs. Dobbie, Edinburgh, for Crocuses.

To Messrs. Fogwill, Guildford, for exhibit of *Primula malacoides* 'Mary Fogwill.'

To Messrs. Low, Enfield, for Carnations.

To Messrs. Napier, Taunton, for Carnations.
To Messrs. Pearson, Lowdham, for Hyacinths and Crocuses.
To Messrs. Toogood, Southampton, for Cinerarias.

Selected for trial at Wisley.
Primula malacoides 'Dignity' from Messrs. Sutton, Reading.
Primula malacoides 'Mary Fogwill' from Messrs. Fogwill, Guildford.
Primula malacoides 'Rosemary' from Messrs. Sutton, Reading.
Primula sinensis 'Crimson Velvet' from Messrs. Hurst, Houndsditch.
Primula sinensis 'Double Charm' from Messrs. Hurst, Houndsditch.
Primula sinensis 'His Excellency' from Messrs. Hurst, Houndsditch.
Primula sinensis 'Scarlet King' from Messrs. Sutton, Reading.

Awards recommended after trial at Wisley.

Award of Merit.

To *Primula malacoides* 'Pink Sensation' from Messrs. Sutton, Reading. See p. 194.

To *Primula sinensis stellata* 'Beacon' from Messrs. Sutton, Reading. See p. 194.

Highly Commended.

To *Primula malacoides* 'Mauve Queen' from Messrs. Sutton, Reading. See p. 193.

Other Exhibits.
Messrs. Hurst, Houndsditch : *Primula sinensis* 'Fascination.'
Messrs. Wakeley, London : Hyacinths, Crocuses, etc.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Silver Banksian Medal.
To Messrs. Cheal, Crawley, for flowering shrubs.
To Mr. E. Ladhams, Elstead, for rock-garden plants and shrubs.

Flora Medal.
To Messrs. Hillier, Winchester, for flowering and evergreen shrubs.
To Hocker Edge Gardens, Cranbrook, for Irises, Crocuses and other bulbous plants.
To Mr. L. Lawrence, Taplow, for succulents.
To Messrs. Pritchard, Christchurch, for rock-garden plants.
To Messrs. Russell, Windlesham, for flowering shrubs.
To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.

Banksian Medal.
To Alpine Nurseries, West Moors, for rock-garden plants.
To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.
To Messrs. Cheal, Crawley, for rock-garden plants.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Messrs. Jackman, Woking, for shrubs.
To Mr. J. Klinkert, Richmond, for clipped trees.
To Knap Hill Nursery, Woking, for flowering and evergreen shrubs.
To the Rev. Canon Meyer, Little Gaddesden, for bulbous Irises.
To Messrs. Neale, Worthing, for succulents.
To Messrs. Stewart, Ferndown, for rock-garden plants and shrubs.
To Messrs. Waterer, Twyford, for rock-garden plants.
To Messrs. Wood, Taplow, for rock-garden plants.

Award of Merit.

To *Romulea nivalis* as a hardy flowering plant (votes 17 for), from G. P. Baker, Esq., Sevenoaks. See p. 194.

Preliminary Commendation.

To *Buddleia grandiflora* as a flowering shrub for the greenhouse (votes 14 for), from the Director, Royal Botanic Gardens, Kew.

Other Exhibits.
Messrs. Burkwood & Skipwith, Kingston : shrubs.
Messrs. Gurteen & Ritson, Horley : shrubs.
Mrs. K. Hopkinson, Coulsdon : rock-garden plants.
Miss A. L. Hutley, Maldon : bulbous Irises.
Messrs. Southgate, New Malden : succulents.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and sixteen other members present.

Awards Recommended :—

Award of Merit.

To *Cymbidium* × 'Harmachis' ('Curlew' × 'Flamingo') (votes 11 for, 5 against), from Messrs. H. G. Alexander, Tetbury. See p. 193.

To *Cymbidium* × 'Rio-Rita' var. 'Rajah' ('Pearl' × 'Ruby') (votes 11 for, 2 against), from Messrs. McBean, Cooksbridge. See p. 193.

Other Exhibits.

Sir Jeremiah Colman, Bart., Gatton Park, Surrey: six well-flowered plants of *Lycaste* × 'Sir Jeremiah Colman.'

Messrs. Stuart Low, Jarvis Brook: a group of Orchids.

Messrs. Armstrong & Brown, Tunbridge Wells: a group of Orchids.

Messrs. McBean, Cooksbridge: a group of Orchids.

Messrs. Charlesworth, Haywards Heath: a group of Orchids.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and twelve other members present.

There were no plants for the Committee's inspection.

JOINT ROCK-GARDEN PLANT COMMITTEE.

There was no business before the Committee on this occasion.

ANNUAL GENERAL MEETING.

FEBRUARY 21, 1939.

REPORT of PROCEEDINGS at the ONE HUNDRED AND THIRTY-FIFTH ANNUAL GENERAL MEETING, held on Tuesday, February 21, 1939, in the New Hall, Greycoat Street, Westminster, London, S.W. 1.

The Right Hon. Lord ABERCONWAY, C.B.E., V.M.H., President, in the Chair, with Members of Council and about two hundred Fellows.

The SECRETARY read the notice convening the Meeting. The Secretary announced that the Minutes of the last Annual Meeting, held on February 22, 1938, had been circulated in the JOURNAL, Vol. 63, Part 4, 1938.

The CHAIRMAN: I beg to move that the Minutes, having been circulated, be taken as read and may be signed as a correct record.

The motion was agreed and the Minutes were signed by the Chairman.

The CHAIRMAN: Ladies and Gentlemen, it is now my duty to move

THAT the Report of the Council be and is hereby adopted.

The Report of the Council has been circulated in our JOURNAL, and I assume that you desire me to take it as read.

At our last Chelsea Show, Their Majesties The King and Queen graciously honoured us with their presence. The sequence of visits of both or one of the reigning Monarchs has, I believe, been unbroken since the first Chelsea Show, the International Show as it was called, was opened by King Edward the Seventh in 1912. This year that unbroken sequence of visits of the reigning Monarchs will be broken. But we rejoice at the cause, because the reason Their Majesties will not be present at Chelsea is on account of the fact that they will be visiting Canada and the United States of America. In Canada their welcome goes without saying; but the interest of a visit of a King and Queen is especially intense, as I have noticed, in a Republic, and when Their Majesties reach the United States of America, I predict that not only will they have a reception probably unequalled in history, but that they will also win the hearts of our American friends as they have won the hearts of their subjects in this country.

We shall, however, look forward to the gracious visit to the Chelsea Show of Their Royal Highnesses The Duke and Duchess of Gloucester, and we shall also hope that Her Majesty Queen Mary will view the Show. Chelsea would hardly seem the same without a visit from Queen Mary.

Our Fellowship has again grown. It is larger by 1,250 Fellows than it was at this time last year. When I first became President—I think it was in 1931—the membership was 28,000; to-day it is very little short of 37,000. I only wish that I had the effrontery to claim any share in that great increase. If the increase in our fellowship this year, 1,250, is not a record increase—and it is not—we have had a record attendance both at Chelsea and at the Fortnightly Shows.

We held a Conference last year, as you will remember, on Flowering Trees and Shrubs which was remarkably well attended. A Conference sounds rather a prosaic affair, but there was one Paper at that Conference, as those of you who were present will recollect, which was by no means a prosaic affair. It was a Paper by Mr. WALLACE (read in Mr. WALLACE's regrettable absence through illness by Mr. CHITTENDEN), giving an account of a tour in an imaginary garden planted evidently a generation ago with all the best and most desirable and rarest of shrubs. We were taken on a tour of this garden and it was like the romantic garden of a dream. I would commend to those of you who have not already got it the Report of the Papers read at that Conference. Not only will you get Mr. WALLACE's Paper, but also an up-to-date account of flowering trees and shrubs by writers who are among the greatest experts on the subject.

We were to have had another Conference this year, this time on Rhododendrons, but unfortunately we had a severe Spring frost last year which cut off the young shoots of most of these plants, and there was a body of opinion which inclined to the view that there would be very few flowers this year. But Rhododendrons are rather like that resourceful mythological monster, the Hydra; when you cut off one of its heads, two more heads grow at once; similarly, when one shoot is cut with frost, two or three more shoots grow, and I think therefore that the frost has not injured our Rhododendrons so much as was at one time feared. At any rate we are going to have the Conference in the year 1940 and we hope that it may be largely attended.

But if we have no Conference this year, we are going to have an Autumn Show again. As I explained to you last year it was intended to hold an Autumn Show at Olympia. Unfortunately it was found that other engagements for the hall had intervened, and to our great disappointment we were told we could not have that hall this year for our Autumn Show. We have, however, arranged to take the large new hall at Earl's Court, and to hold an Autumn Show this Autumn, a little earlier than last year, on September 13, 14 and 15. This is somewhat of an experiment, because this is a new hall which flower lovers have not yet got accustomed to visiting. As far as the Royal Horticultural Society is concerned, it is an expensive experiment, because the hall is very large and therefore costly to hire. I think it should be a magnificent Show, and I am sure that our friends, the exhibitors, will do their very best to fill it with worthy plants. I much hope that when our Fellows come and see these plants in September, which is just before planting time, they will recollect that even in times of international unrest the Nurseryman has to live and that his overhead charges are high. I hope, therefore, that our Fellows will be liberal in the orders which they may place.

Of course a Show of this kind is primarily for our Fellows, and it is especially important I think for those Fellows who live at a distance, and for professional gardeners who when they come up to London want to come up for some big event. But I hope also that it may attract the general public, because if it attracts the general public, it will be a great inducement to us to hold the Show in this hall on other occasions. The size of the hall precludes any fear of overcrowding. We cannot hope of course to rival the attractiveness of a baby Giant Panda, but at any rate the Show will be more beautiful even if it is not quite as cute.

We propose to make another experiment this year—though perhaps I ought not to call it an experiment, because it is a revival of an old custom. We propose on Wednesday, the second day of each Fortnightly Show, to have an informal talk about the flowers at the Show. We shall get some well-known horticulturist to give a short address on the principal plants that have been shown, and we hope that the audience will join in, and that we may have a thorough and pleasant discussion upon them. The first of these informal talks will take place to-morrow, Wednesday, at 3.30, and the man who will lead the discussion will be our friend Mr. CURTIS, so well known to all of you who read The Gardeners' Chronicle.

Our publications are always an important part of our work. We are publishing again the Lily and the Daffodil Year-Books. We have in the Press, and are publishing in the autumn, a supplement to the Index Londinensis which will bring that work up to the year 1935. As most of you are aware, the Index Londinensis is a continuation of the work previously known as " Pritzel," and contains a complete index under the different plant names of the published illustrations of that particular plant. It is, of course, perhaps not a book which can have a very large circulation, but it is an invaluable work of reference to those undertaking botanical writing or horticultural research.

The first volume of the promised Colour Chart was published in December, and has had an excellent reception. The second volume giving intermediate shades of colours will be published towards the end of the year. When this Chart gets thoroughly assimilated and is used by the compilers of catalogues, there will be no excuse for calling blue a colour which is largely red, or calling red a colour which is largely blue.

Regarding Wisley I have nothing sensational to report or predict.

We regret that Mr. FINDLAY, the Keeper of the Gardens, has left us to take up another important post, and we promoted Mr. BLAKEY, who has been with us for a great many years in the position of leading foreman, to the position of Keeper of the Gardens, of course under our friend Mr. HARROW. Visitors are continually increasing in numbers. We are getting on with the planting of our new land. The Rhododendrons have been planted in the Rhododendron Trial Ground, although they will not be judged this year as they may not all have recovered from the effects of their removal. Mr. HARROW's genius for plant cultivation, in my opinion, each year makes the garden more interesting and more beautiful.

Then I have a message from a distance. Most of you will have seen the reference in the February number of our JOURNAL to the invitation of the President of the New York Horticultural Society in connexion with the New York World's Fair, which takes place early this summer, and the important Garden Section thereof. Mr. H. F. DU PONT wrote saying that if any Fellows of this Society, either individually or in groups, cared to come and see the World's Fair, and especially the Horticultural Section, they would be received with special attention, and the New York Garden Clubs would, in addition, see that private gardens were thrown open to them. I have had personal experience of the kindliness of the welcome that comes from American gardening friends. They welcome us as guests, they double the welcome because we are English, and they quadruple it because we are gardeners. If any of you are able to be in the States during the Fair and would send your names to Colonel DURHAM, the Secretary of our Society, he will communicate with our American colleagues on the matter.

At this time of the year we have changes in the Council. Mr. TROTTER since our last meeting accepted an important business appointment, and the result of that, to our very great regret, was that he had to give up his position as Treasurer of the Society, and is retiring from the Council. Mr. TROTTER has been good enough to act as Treasurer for a number of years to the very great advantage of our finances. We are extremely sorry to lose him, but congratulate him on the reason which rendered that step inevitable.

Mr. GEORGE MONRO was good enough to consent to take Mr. TROTTER'S place. I have heard it said that the arithmetic of gardeners is somewhat of a muddled affair, because when we want to multiply our plants we begin by dividing them. I can assure you, however, that Mr. MONRO'S finance is founded on an experience as wide as it has been successful, and he adds to that great experience a limitless willingness to help.

Mr. STEVENSON we are also losing. He has served his five-year term on the Council, but will be eligible for re-election this time next year. We shall miss very much his specialized knowledge both of publications and of building operations, but we hope to have his services again before many months have passed.

We are losing Mr. SUTTON, a great exhibitor, as you all know, and a great grower of plants, a man who has always placed his knowledge and advice most freely at our disposal.

Mr. BOWLES also retires from the Council, but as you are no doubt aware, under our Charter the Council has the right to nominate one retiring member of Council for immediate re-election. Mr. BOWLES is good enough to act as Vice-Chairman of the Council, and we have nominated him for re-election to-day. Not only is he Vice-Chairman of the Council, but I think in his knowledge of plants he is probably among the first six or eight most expert persons in the world, our friend Mr. CHITTENDEN being another. He is an artist, he is a writer, and he is a great stickler for precedent—I do not know whether he would pass the word " stickler," it probably occurred in CHAUCER—and he keeps the Council in the straight and narrow way when they tend to deviate unduly from it. Mr. BOWLES has also been for some time the Father of the Council, not, I am glad to say, in age, but in years of service. It has sometimes occurred to us that as Father of the Council he ought to wear, as an insignia of office so to speak, a long white beard. Mr. BOWLES, as we all know, can grow anything and we venture to live in the hope that one day we shall see this crowning triumph of his cultural achievements.

But if the Council has its losses, it also has its gains. Mr. BOWES-LYON we shall welcome back again among our number. He has used his year of retirement I understand to become a banker, and he will be able to co-operate with Mr. MONRO in financial matters.

Lord STRATHCONA is a new member. He gardens in an island where I believe his thermometer never need register below freezing, because he never has frost, but where on the other hand his wind gauge sometimes has to register up to 120 miles an hour of gale. On him has fallen part of the horticultural mantle of his father-in-law, that great gardener, the late Lord WAKEHURST, who did so much for the Society.

Then joining the Council is Mr. F. A. SECRETT. Mr. SECRETT'S name is very well known to those of you who visit our exhibits of market produce. Mr. SECRETT was well on the way to revolutionizing market gardening, but unfortunately, the Metropolitan Water Board a year or two ago revolutionized his market garden by commandeering it for a reservoir, a great misfortune for all concerned. I am glad to say that he has been able to re-establish his business in a part of the world which he assures me is remote from any encroachment on the part of a Water Board. That concludes the additions to the Council.

In our Staff we have had few changes, which is as it should be. We should be lost without our Secretary, while Mr. SIMMONDS, his able assistant, is elaborating surprises, I understand, for Chelsea, 1940. At the same time we lose no opportunity of recruiting young men of ability, because we feel that the future of a Society such as this lies eventually in a younger generation than the one standing before you to-day.

Our voluntary helpers have again been a very great feature of our work; their numbers are legion and their services are beyond price, and we owe them a very deep debt of gratitude for all they do. I do not think that any Society has a greater number of voluntary helpers than the Royal Horticultural Society, or a body of helpers who work harder.

Lastly, I would like to say how much your Executive appreciates the support of the Fellows. The guineas, still better the two guineas, or better still the four guineas, subscribed so punctually and ungrudgingly by our Fellows make up that great revenue which we believe means so much to horticulture.

I understand that the Fellows of some Societies hurl winged words of criticism or abuse at the heads of the Presidents, the Treasurers and the Secretaries. That is not so with our Fellows. Perhaps it is the soothing influence of the flowers among which they work. Perhaps—dare I add this—it is a reflection that the Royal Horticultural Society of which they are Fellows treats them fairly well. If that is the view of the Fellows here, my Council, my Staff, and I myself, feel very satisfied and very grateful.

I will now call on Mr. MONRO to second the Motion I have moved.

Mr. GEORGE MONRO: Mr. President, Ladies and Gentlemen, it is pleasant to be able to report that there is nothing of special importance to which your attention should be drawn. In fact, the accounts follow very closely the ordinary routine of the Society and its growth.

However, accounts are, so to speak, the looking-glass of the activities of the Society, and there may be one or two matters which are of interest and worth while just drawing attention to.

Taking the expenditure first, the administration costs must necessarily follow the growth of the Society, and a small increase has to be reported which, in fact, is due more to the adjustment of accounts arising out of the allocations to other items of expenditure such as the absence of an Autumn Show.

The JOURNAL and the Society's publications are indications of the activities of the Society and its usefulness. Although it is unfortunate that there is an increase in its expenditure (£973 this year) this increase is due mostly to the higher cost of printing and paper, and also in part to the very satisfactory state of affairs, the increase in the number of Fellows which the President mentioned in his speech.

The policy with regard to the Society's publications has always been that the cost is written off against the year's revenue in which the expenditure is incurred, and no account of the value of stock is carried forward into future years.

The expenditure on meetings and shows you will notice was less, owing to there being no Autumn Show in this year. The whole of the extra cost required for the rearrangement of the setting out of the Show at Chelsea, the two large marquees, etc., was written off last year when the expenditure was incurred, so that the accounts this year will have the benefit of that non-recurring expenditure.

The Library has been maintained by the further purchase of books.

Under special expenditure there are one or two items worthy of attention. The policy of subscribing to expeditions for the collection and introduction of new plants has been continued.

The expenses of the successful Conference on Flowering Trees and Shrubs, and also the expenses of a deputation to the International Horticultural Congress which we sent to Berlin, will be noted amongst the expenditure.

The maintenance of the Society's buildings is expressed in the expenditure of £1,168 for the redecoration of the Old Hall, and it will be observed that this expenditure has been written off in this year's accounts.

The usual charities and subscriptions to Societies have been supported.

On the receipt side the annual subscriptions show a satisfactory increase of revenue of £1,867, but on the other hand, the hall lettings have not brought in quite such a large revenue.

To take the Wisley Gardens, there is also very little of outstanding importance to report. The expenditure shows a slight increase —£16,423 to £16,757—a matter of some £330, most of this being due to the normal rise of wages.

The special expenditure at Wisley has returned to more normal figures, the land purchases of previous years having been paid for and written off.

Turning to the Balance Sheet, it will be seen that the Accumulated Funds Account has been maintained at £250,000.

The full details of these accounts are printed in the JOURNAL, and it will be noted that £11,520 has now been added to the General Surplus Fund, which is separate from that General Reserve of £250,000 and the General Surplus now stands at a figure of £39,844. This sum of £11,520 is shown in the Balance Sheet by the increase of General Investments of £4,988 and the repayment of the Bank Overdraft, £6,557, which was brought in at the beginning of last year.

The Sinking Fund on the two Halls has received its annual appropriation of £3,366 plus interest, and this Fund now stands at £26,175.

Perhaps one of the most pleasant things to report is the interest that Fellows have in the Society. Last year a legacy of £500 from the executors of Dame JULIA TILDEN was reported, and this year the Society has been fortunate enough to receive two further legacies, one from the late Mrs. A. C. CHARRINGTON to the value of £500 to be devoted to the general purposes of the Society, and a further one of £100 from the late Mr. H. DE T. GLAZEBROOK which is specially bequeathed for prize money purposes.

It will be agreed that this appreciation of the usefulness of the Society is exceedingly satisfactory, and is also a source of revenue which is capable of unlimited expansion.

The details of all the Trust Funds appear at the end of the Accounts, and this year the list of the Society's investments is likewise published.

This is but a brief summary of the Accounts, which from every point of view appear to be entirely satisfactory, but should anyone present desire further explanations, I should be pleased to give them, or our Auditors, who are present, would be only too willing to elucidate anything you may wish explained.

If I might just add one or two words to that financial report, it would be to thank the Press, both the Trade and the Daily Press, for the support and encouragement which they have given to the Society and the Council, not only with regard to meetings, but in all ways connected with the work of the Society.

I have much pleasure in seconding the adoption of the Report.

The CHAIRMAN: Before I put the Motion, does any Fellow desire to ask any question? If so, I will endeavour to answer to the best of my ability. If there is no question, I will put the Motion

THAT the Report of the Council be and is hereby adopted.

The Motion was carried unanimously.

Mr. E. A. BOWLES: Before I proceed with my duties as Vice-Chairman may I make a few personal remarks, for I cannot miss the opportunity of thanking the President for the undeserved and charming things he has said about me, and to apologize to you for not appearing with the hirsute adornment mentioned. If I had only known of it before I might have brought with me the beautiful flowing white beard in which I have appeared many times at children's parties as Father Christmas. I did not realize it was necessary for the Father of the Council and I am not at all sure that I am converted to the idea of trying to raise it naturally. I have always been glad to get rid of the other one and the tremendous responsibility of discovering the right disposal of it, whether under or over the sheets.

What I am really standing before you to do is to perform the last duty that always falls to the Vice-Chairman of the Council before he retires at the end of the Annual Meeting, that is to announce to you the election of a President. It is with great pleasure and satisfaction that I am able to tell you that in response to the unanimous request of the Council, Lord ABERCONWAY very kindly consented to let his name be put forward for re-election and that in the absence of any other nomination, under By-law 57, I declare him to be truly and properly elected as your President, which is very good news for us all.

The PRESIDENT: Ladies and Gentlemen, I need hardly express my indebtedness to the Council for nominating me as your President, and my indebtedness to the Fellows for accepting that nomination without opposition. I can assure you I consider it a most distinguished honour, the most distinguished honour that a horticulturist can have, to stand before you and be elected as your President. Anything I can do to further the objects of the Society, in which I have always had the keenest interest, will be most ungrudgingly done.

I now have the pleasure to declare the election of the following as Vice-Presidents, they having been duly proposed and no alternative candidates having appeared:

The Duke of Bedford.
The Duke of Portland.
The Marquess of Headfort.
The Viscount Ullswater.
Sir Daniel Hall.
Lieut.-Colonel Sir David Prain.
Mr. E. A. Bowles.
Mr. C. T. Musgrave.
Mr. C. G. A. Nix.
Mr. J. C. Williams.

Of these names there is one new one, that is the name of Lord HEADFORT, President of the Horticultural Society of Ireland, one of the keenest of gardeners and a very good friend to this Society. The Council were only too glad to add his name to the list of its distinguished Vice-Presidents.

As Members of Council there have been duly nominated, and there are no alternative nominations, the following:

The Hon. David Bowes-Lyon.
Mr. E. A. Bowles.
Mr. F. A. Secrett.
Lord Strathcona and Mount Royal.

I therefore declare them duly elected.

As Treasurer, I declare the election of Mr. George Monro.

As Auditor, I declare the election of Mr. J. S. Feather, of Messrs. Harper, Feather & Paterson. Mr. Feather has been of the very greatest possible assistance to us in some very intricate negotiations with the Income Tax people during the past year.

Now I come to the Presentations.

PRESENTATIONS.

Victoria Medals of Honour.—To British Horticulturists resident in the United Kingdom and deserving special honour at the hands of the Society.

The SECRETARY: Dr. W. F. BEWLEY.

The PRESIDENT: Dr. BEWLEY, as Director of the Cheshunt Research Station for a very great many years has done research work of the greatest possible value to horticulture and agriculture. I have very great pleasure in presenting you with this medal, Dr. BEWLEY.

The SECRETARY: Mr. H. R. DARLINGTON.

The PRESIDENT: Mr. DARLINGTON is a noted rose and daffodil grower. I believe he tries every rose, good, bad or indifferent, in his garden, and it is a very great blow to us all that a rose named after him has not been one of the most successful, except, as he says, in Australia.

The SECRETARY: Mr. F. G. PRESTON.

The PRESIDENT: Mr. PRESTON as we all know is the Superintendent of the University Botanic Gardens at Cambridge. He struggles with a very adverse climate and a very adverse soil, but rises superior to both, and his garden is one of the most interesting in the country. In addition to that, Mr. PRESTON is an absolutely first-class Judge, and I am told by those who go round judging with him that it is a real pleasure to have him as a colleague. I congratulate you, Mr. PRESTON.

The SECRETARY: Mr. G. REUTHE.

The PRESIDENT: Mr. REUTHE has a very profound knowledge of and is a great grower of rare and more or less tender shrubs. He is on our Floral Committee B, and is never at a loss for a name for a plant, and what is more, it is always the correct name, which is not always the case with other people. Mr. REUTHE, I congratulate you, you have introduced many lovely shrubs to our gardens and I hope you will introduce many more.

As **Associates of Honour** the following have been elected:

Mr. W. J. BLAKEY, Superintendent of the Floral Department (now Keeper of the Gardens) at Wisley.

Mr. J. BUCKMAN, Head Gardener at Highdown, Goring-by-Sea.

Mr. H. ELPHICK, Nursery Manager of Messrs. R. Wallace, Tunbridge Wells.

Mr. G. F. JOHNSON, Head Gardener at Waddesdon Manor, Aylesbury.

Mr. J. PRIOR, Foreman of Messrs. D. Stewart, Ferndown, Dorset.

Mr. R. K. SILLARS, late Foreman of Messrs. Samsons, Kilmarnock.

The late Mr. W. STEWART,* Superintendent of the Grounds, Royal Hospital, Chelsea.

The Lawrence Medal.—To Messrs. SUTTON & SONS, LTD., for their exhibit of Vegetables staged on October 11, 1938.

The Holford Medal.—To Colonel STEPHENSON R. CLARKE, C.B., LL.D., V.M.H., for his exhibit of Flowering Shrubs staged on April 26, 1938.

The Veitch Memorial Medal in Gold.—To Mr. M. B. CRANE, A.L.S., for his work on the genetics of fruit trees.

To Miss I. PRESTON, for her work in raising good garden plants.

The Sander Medal.—To the Hon. HENRY S. TUFTON, for Cymbidium 'Janette' var. 'Jeanine' shown on February 8, 1938.

The George Moore Medal.—To Mr. H. BARNARD-HANKEY, for Cypripedium 'Wendover' shown on November 29, 1938.

The Williams Memorial Medals.—To Messrs. J. & A. MCBEAN, for their exhibit of Cymbidiums staged on March 22, 1938.

To Messrs. BLACKMORE & LANGDON, for their exhibit of Delphiniums staged on June 21, 1938.

The Reginald Cory Memorial Cup.—To Mr. E. BALLARD, for his *Hepatica × media Ballardii* shown on March 8, 1938.

The Loder Rhododendron Cup.—To Mr. F. GOMER WATERER, for his work on the cultivation and hybridization of Rhododendrons.

That, Ladies and Gentlemen, concludes our presentations.

Colonel STEPHENSON CLARKE: My Lords, Ladies and Gentlemen, it is manifest we cannot disperse this afternoon without passing a Vote of Thanks to our President and Chairman for the able way in which he has presided over us. As this task has been placed in my hands, I am sure you would like me to add our thanks for the work he has done, not only to-day but all the year round. It is due to the hard work, careful attention and surveillance of our President and the Council that this wonderful Society continues to increase, not only in numbers but in value and beauty of its exhibits. I beg to propose a very hearty Vote of Thanks to our Chairman, Lord ABERCONWAY.

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* Mr. W. STEWART died November 13, 1938.

Mr. CURTIS: My Lords, Ladies and Gentlemen, I have very much pleasure in seconding the Vote of Thanks so ably proposed by Colonel STEPHENSON CLARKE. I am sure you will understand, Mr. President, the warmth of our appreciation is at least of the temperature of this particular room.

(*Motion put and carried with acclamation.*)

The CHAIRMAN: Colonel STEPHENSON CLARKE, Mr. CURTIS, Ladies and Gentlemen, I thank you most sincerely for the very cordial way in which the Mover and Seconder have put this Motion to you, and for the unanimous way in which you have accepted it. It is always a pleasure to me to preside at these meetings, they are always characterized by the greatest good humour and unanimity, and it is a very great pleasure indeed to be in the Chair.

I thank you all, Ladies and Gentlemen. That concludes the business of the meeting.

(*The proceedings then terminated.*)

GENERAL MEETINGS.

FEBRUARY 21, 1939.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Oxalis tuberosa vars.—Dr. Tincker showed tubers of three forms of *Oxalis tuberosa*, one yellow-tubered, one white, and one red. He had failed to flower either the red or the yellow-tubered forms, and the white one had produced only medium-styled flowers which, however, had set seed freely. He understood others had failed to flower the yellow- and red-tubered varieties.

Insects in seeds.—Mr. G. F. Wilson showed seeds of a species of Ipomoea collected in Mexico by Mr. E. K. Balls which were (to the extent of 90 per cent.) attacked by a beetle, *Bruchus contaminatus*.

Small species of Narcissi.—A species of Narcissus allied to *N. juncifolius*, named *N. calcicola*, a native of Portugal, and a small early-flowering variety of *N. Bulbocodium* called *tenuifolius* (*N. tenuifolius* of Salisbury) were before the Committee, the former shown by Mr. A. Gray of Devoran, the latter by Messrs. Stewart of Ferndown.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and fourteen other members present.

There was no business before the Committee on this occasion.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Baron Bruno Schröder (gr. Mr. F. A. Bush, N.D.H.), Englefield Green, for Clivias.

To Messrs. Sutton, Reading, for Primulas.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Bath, Wisbech, for Daffodils, Tulips, Hyacinths.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Cyclamen.
To Messrs. G. H. Dalrymple, Bartley, for Freesias.
To Messrs. Prins, Wisbech, for Daffodils, Tulips, Hyacinths.

Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, *Euphorbia fulgens*, Pansies.
To Messrs. Pearson, Lowdham, for Daffodils, Hyacinths, Crocuses.

Banksian Medal.

To Ashington Nurseries, Ashington, for Carnations.
To Messrs. Low, Enfield, for Carnations.
To Messrs. Napier, Taunton, for Carnations.
To Messrs. Toogood, Southampton, for Primulas.
To Messrs. Wakeley, London, for Crocuses, Daffodils, etc.

Award of Merit.

To *Clivia* ' Marga Schröder ' as a greenhouse flowering plant (votes unanimous), from Baron Bruno Schröder (gr. Mr. F. A. Bush, N.D.H.), Englefield Green. See p. 193.

Other Exhibits.

Messrs. Brooks, Basingstoke : *Primula* ' Vivid.'
R. F. W. Cartwright, Esq., Banbury : *Hippeastrum* ' Royal Rose.'
Messrs. Clark, Dover : Primroses and other hardy plants.
Messrs. Hurst, London : *Primula obconica* ' Chenies Blood Red,' ' Chenies Blue,' ' Chenies Crimson ' and ' Chenies Lilac.'

FLORAL COMMITTEE B.—Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-four other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Elliott, Stevenage, for Saxifrages in pans.

Silver Flora Medal.

To Messrs. Cheal, Crawley, for flowering shrubs.
To Knap Hill Nursery, Woking, for flowering shrubs.
To Messrs. Waterer, Bagshot, for flowering shrubs.

Silver Banksian Medal.

To Messrs. Russell, Windlesham, for flowering shrubs.
To Messrs. Wood, Taplow, for flowering shrubs.

Lindley Medal.

To T. T. Barnard, Esq., Wareham, for Cape bulbous plants.

Flora Medal.

To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.
To Brookside Nurseries, Oxford, for Saxifrages.
To Messrs. Hillier, Winchester, for flowering shrubs.
To Hocker Edge Gardens, Cranbrook, for Irises and other bulbous plants.
To Mr. E. Ladhams, Elstead, for rock garden plants and shrubs.
To Messrs. Stuart Low, Enfield, for Camellias.
To Messrs. Prichard, Christchurch, for rock garden plants.
To Messrs. Waterer, Twyford, for rock garden plants.

Banksian Medal.

To Alpine Nurseries, West Moors, for rock garden plants.
To Messrs. Cheal, Crawley, for Irises, Crocuses and rock garden plants.
To Messrs. Jackman, Woking, for flowering shrubs.
To Letchworth Plants, Ltd., Letchworth, for rock garden plants.
To Messrs. Maxwell & Beale, Broadstone, for rock garden plants.
To Messrs. Neale, Worthing, for succulents.
To Messrs. Reuthe, Keston, for shrubs.
To Messrs. Stewart, Ferndown, for shrubs and rock garden plants
To Mr. G. Welch, Cambridge, for rock garden plants
To Messrs. Wood, Taplow, for rock garden plants.

Award of Merit.

To *Crocus chrysanthus* 'Zwanenberg Bronze' as a hardy flowering plant (votes 12 for, 6 against), from G. P. Baker, Esq., Sevenoaks. See p. 193.

To *Sansevieria trifasciata* var. *Laurentii* as a decorative foliage plant for room or window culture (votes 14 for, 5 against), from C. H. Curtis, Esq., London, W.C. 1. See p. 194.

Preliminary Commendation.

To *Clematis napaulensis* as a tender flowering shrub (votes unanimous), from G. H. Johnstone, Esq., Trewithen.

Other Exhibits.

Abercorn Nurseries, Chelmsford : rock garden plants.
Messrs. Burkwood & Skipwith, Kingston : flowering shrubs.
Chez Nous Nurseries, Newick : rock garden plants.
Messrs. Clark, Dover : shrubs.
Messrs. Constable, Southborough : Notholirions and Lachenalias.
Mr. A. Corderoy, Eltham : rock garden plants.
Dartington Hall, Ltd., Totnes : shrubs and rock plants.
Draycott Flower Farm, Campden : rock garden plants.
Messrs. Gurteen & Ritson, Horley : shrubs.
Mr. K. W. Harle, Lower Basildon : succulents.
Hocker Edge Gardens, Cranbrook : Cyclamens and Freesias.
Hollamby's Nurseries, Groombridge : shrubs.
Mr. J. Klinkert, Richmond : clipped trees.
Marsden Nurseries, Ashtead : rock garden plants.
Orchard Neville Nurseries, Baltonsborough : rock garden plants.
L. de Rothschild, Esq., Exbury : *Erica caffra*.
Messrs. Southgate, New Malden : succulents.
Horticultural College, Swanley : Begonias.
Messrs. Taylor, Bexley : shrubs.
Messrs. Waterer, Bagshot : Prunus 'Pandora.'
Waterperry School of Horticulture, Oxford : rock garden plants.
Messrs. Woodward, Findon : rock garden plants and shrubs.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and sixteen other members present.

Award Recommended :

Award of Merit.

To *Odontioda* × 'Patra' (*Odontioda* × 'Geisha' × *Odontioda* × 'Vesuvius') (votes unanimous), from H. S. Wharton, Esq., "Shelstone," Templewood Avenue, Hampstead. See p. 193.

Other Exhibits.

Messrs. Sanders, St. Albans : a group of Orchids.
Messrs. Charlesworth, Haywards Heath : a group of Orchids.
Messrs. Stuart Low, Jarvis Brook : a group of Orchids.
Messrs. Armstrong & Brown, Tunbridge Wells : a group of Orchids.
Messrs. Black & Flory, Slough : a group of Cypripediums.
Messrs. H. G. Alexander, Tetbury : a group of Orchids.
Messrs. J. & A. McBean, Cooksbridge : a group of Orchids.
H. Barnard Hankey, Esq., East Burnham Park : *Cypripedium* × 'Tommer.'
E. Kenneth Wilson, Esq., Cannizaro, Wimbledon : *Cymbidium* × 'Thetis.'
F. E. Griggs, Esq., Chislehurst : *Odontioda* × 'Conchita.'

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

February 21, 1939.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :

Silver Banksian Medal.

To Messrs. Carters Tested Seeds, Raynes Park, for an exhibit of Single Early Tulips.

To Messrs. Dobbie, Edinburgh, for an exhibit of Daffodils.

Flora Medal.

To The Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

Banksian Medal.

To Mr. R. F. Calvert, Coverack, Helston, Cornwall, for an exhibit of Daffodils.

Other Exhibit.

Mr. A. Gray, Penpol, Devoran, Truro : *Narcissus calcicola.*

JOINT RHODODENDRON COMMITTEE.—Mr. E. H. Wilding in the Chair, and eleven other members present.

No awards were recommended on this occasion.

Exhibits.

Lionel de Rothschild, Esq., Exbury, Southampton : two forms of *Rhododendron* × ' Diogenes ' (*R. calophytum* × *R.* × ' Red Argenteum').

E. J. P. Magor, Esq., St. Tudy, Cornwall : *R.* × ' Dione ' (*R.* × ' Cornsutch ' × *R. neriiflorum*).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. F. C. Stern, F.L.S., in the Chair, and ten other members present.

Exhibit.

Messrs. M. Prichard, Christchurch, Hants : *Saxifraga* ' Iris Prichard.'

March 7, 1939.

A lecture was given by Mr. D. E. Horton on " Bulb Experiments." Chairman, Mr. G. W. Leak, V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

The only business before the Committee was the naming of plants shown before the Floral Committee B, and the Rock-garden Plant Committee, including *Merendera sobilifera* (*Colchicum sobiliferum*) and *Mitriostigma axillare* (*Gardenia citriodora*).

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and thirteen other members present.

Exhibit.

Mr. E. A. Bunyard, Allington, Maidstone : Apple ' St. Augustine's Orange.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Engelmann, Saffron Walden, for Carnations, *Euphorbia fulgens* and Pansies.

Flora Medal.

To Messrs. Low, Enfield, for Carnations.

To Mr. F. Everitt, Enfield Lock, for Clivias and Hippeastrums.

Banksian Medal.

To Misses Allen-Brown, Henfield, for Violets.

To Messrs. Napier, Taunton, for Carnations.

To Swanley Horticultural College, Swanley, for Hippeastrums, etc.

To Messrs. Wakeley, London, for Crocuses, Daffodils, etc.

Selected for trial at Wisley.

Primula malacoides ' Pixie,' from Messrs. Watkins & Simpson, London.

Primula malacoides ' Snowstorm,' from Messrs. Watkins & Simpson, London.

Other Exhibits.

Messrs. Clark, Dover : Primroses, Violas, etc.

Dartington Hall Ltd., Totnes : *Primula acaulis* × ' Betty Green.'

White House Gardens, Abergavenny : *Primula acaulis* × ' Betty Green.'

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-five other members present.

Awards Recommended :

Silver-gilt Flora Medal.

To Messrs. Cheal, Crawley, for flowering trees and shrubs.

To Messrs. Elliott, Stevenage, for Saxifrages.

To Messrs. Hillier, Winchester, for flowering trees and shrubs.

To Messrs. Waterer, Bagshot, for flowering trees and shrubs.

Silver-gilt Banksian Medal.

To Brookside Nurseries, Oxford, for Saxifrages.

To Knap Hill Nursery, Woking, for flowering trees and shrubs.

To Messrs. Russell, Windlesham, for flowering trees and shrubs.

Silver Flora Medal.

To Messrs. Stuart Low, Enfield, for Camellias.

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, for rock garden plants and shrubs.

Flora Medal.

To Messrs. Bedford & Page, Cambridge, for rock garden plants.

To Messrs. Gill, Penryn, for Rhododendrons and Anemones.

To Hocker Edge Gardens, Cranbrook, for bulbous and rock garden plants.

To Messrs. Jackman, Woking, for flowering shrubs.

To Messrs. Waterer, Twyford, for rock garden plants.

To Messrs. Wood, Taplow, for rock garden plants.

Banksian Medal.

To Alpine Nurseries, West Moors, for rock garden plants.

To Mr. K. W. Harle, Lower Basildon, for succulents.

To Mr. J. Klinkert, Richmond, for clipped trees.

To Messrs. Maxwell & Beale, Broadstone, for rock garden plants.

To Messrs. Prichard, Christchurch, for rock garden plants.

To Messrs. Reuthe, Keston, for flowering shrubs.

To Messrs. Stewart, Ferndown, for Narcissi and other flowering plants.

To Mr. G. Welch, Cambridge, for rock garden plants.

To Mr. G. G. Whitelegg, Chislehurst, for rock garden plants.

Award of Merit.

To *Mitriostigma axillare* (syn. *Gardenia citriodora*) as a flowering shrub for the greenhouse (votes unanimous), from Messrs. Russell, Windlesham. See p. 230.

Other Exhibits.

Abercorn Nurseries, Chelmsford : rock garden plants.
Messrs. Burkwood & Skipwith, Kingston : flowering shrubs.
Messrs. Cheal, Crawley : rock garden plants.
Chez Nous Nurseries, Newick : rock garden plants.
Messrs. Constable, Southborough : Tulipa and Iris species.
Mr. A. Corderoy, Eltham : rock garden plants.
Dartington Hall, Ltd., Totnes : rock garden plants.
Dame Alice Godman, Horsham : *Jasminum polyanthum.*
Messrs. Gurteen & Ritson, Horley : shrubs.
Mrs. Hopkinson, Coulsdon : rock garden plants.
Messrs. Jackman, Woking : flowering shrubs.
Lady Lawrence, Dorking : *Asarum europaeum forma, Merendera sobolifera, Cyclamen persicum.*
Marsden Nurseries, Ashtead : rock garden plants.
Orchard Neville Nurseries, Baltonsborough : rock garden plants.
Lieut.-Col. W. R. Pinwill, Probus : *Magnolia Campbellii.*
Messrs. Rogers, Southampton : rock garden plants.
Messrs. Russell, Windlesham : *Prunus Persica* ' Windle Weeping.'
Messrs. Southgate, New Malden : succulents.
Waterperry School of Horticulture, Oxford : rock garden plants.
White House Gardens, Abergavenny : rock garden plants.
Messrs. Woodward, Findon : rock garden plants.

ORCHID COMMITTEE.—LIONEL DE ROTHSCHILD, Esq., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a group of Odontiodas.

Award of Merit.

To *Odontioda* × ' Pauline ' var. ' Glory ' (*Odontioda* × *Leeana* × *Odontoglossum* × ' Miguelito ') (votes 10 for, 4 against), from Messrs. Stuart Low, Jarvis Brook, Sussex. See p. 230.

To *Laeliocattleya* × ' New York,' Dell Park var. (*C.* × ' Maggie Raphael ' × *L.-c.* × ' Aconcagua ') (votes 11 for), from Baron Bruno Schröder, The Dell Park, Englefield Green, Surrey. See p. 229.

To *Potinara* × ' Dorothy ' var. *magnifica* (*B.-l.-c.* × *maculata* × *S.-l.-c.* × ' Prince Hirohito ') (votes 10 for, 1 against), from Baron Bruno Schröder. See p. 230.

To *Lycaste Skinneri* var. ' Snow Queen ' (votes 11 for), from Sir Jeremiah Colman, Bart., Gatton Park, Surrey. See p. 229.

Other Exhibits.

Messrs. Stuart Low, Jarvis Brook : a group of Orchids.
Messrs. Armstrong & Brown, Tunbridge Wells : a group of Orchids.
Messrs. H. G. Alexander, Tetbury : a group of Orchids.
Messrs. Sanders, St. Albans : a group of Orchids.
Messrs. J. & A. McBean, Cooksbridge : a group of Orchids.
Sir William Cooke, Bart., Hampstead Norris : *Cymbidium* × ' Woodcock,' Wyld Court var.
Mrs. Geoffrey Duveen, Broadway, Limpsfield : Cypripediums.
Chester Gayton, Esq., Purley : *Cattleya* × ' Woltho.'

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To The Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. Barr, 11 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

To Mr. R. F. Calvert, Carnsulan, Coverack, Cornwall, for an exhibit of Daffodils.

To Messrs. J. R. Pearson, Lowdham, for an exhibit of Daffodils in bowls.

Silver Banksian Medal.

To Messrs. Barr, for an exhibit of Daffodils in pots.

To Messrs. R. H. Bath, Wisbech, for an exhibit of Tulips and Daffodils.

To Messrs. Carters Tested Seeds, Raynes Park, for an exhibit of Daffodils in bowls.

To Messrs. Dobbie, Edinburgh, for an exhibit of Daffodils.

Flora Medal.

To Messrs. H. Prins, Wisbech, for an exhibit of Daffodils.

Other Exhibits.

Messrs. Kelway & Son, Langport: Daffodils and Tulips.

Captain H. G. Hawker, Strode, Ermington: *Narcissus* 'Ermington.'

JOINT RHODODENDRON COMMITTEE.—Mr. E. H. WILDING in the Chair, and thirteen other members present.

Awards Recommended:

Award of Merit.

To *Rhododendron* × 'Amalfi' (*R. calophytum* × *R.* × 'Cornubia ') (votes 9 for), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 231.

Other Exhibits.

Lionel de Rothschild, Esq.: *R. Ririei* (**A.M.** 1931); *R.* × 'Endeavour' (*R. arboreum album* × *R. lacteum*) (to be seen again); and an unnamed hybrid, *R.* × 'Lord Milner' × *R. sutchuenense.*

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. F. C. STERN, F.L.S., in the Chair, and ten other members present.

Award Recommended:—

Award of Merit.

To *Asphodelus acaulis* as a hardy flowering plant for the alpine house (votes 7 for), from Mrs. Robert Lukin, Goddard's Green, nr. Mortimer. See p. 229.

Other Exhibits.

Dame Alice Godman, Horsham: *Arabis purpurea, Crassula* sp., *Oxalis obtusa.*

Messrs. M. Prichard, Christchurch: *Saxifraga* 'Delia' (**A.M.** 1928), *S.* 'Buttercup' (**P.C.** 1936).

MARCH 21, 1939.

CYMBIDIUM TROPHY COMPETITION.

The Silver Trophy for the best exhibit of twelve Cymbidium plants exhibited by an amateur was awarded to Sir William Cooke, Bt., Newbury.

A lecture was given by Mr. GUY L. WILSON on "Daffodil Gardening." Chairman, Mr. E. A. BOWLES, V.M.H. (See p. 206.)

SCIENTIFIC COMMITTEE.—Dr. M. A. H. TINCKER, M.A., in the Chair, and four other members present.

Tulipa saxatilis cretica.—Mr. G. P. Baker showed a plant of the Crete Tulip, sometimes called *Tulipa cretica,* differing mainly in size from the well-known *T. saxatilis.*

Plants for identification were sent by various Fellows and were dealt with. Mr. Cotton reported that neither the Oxalis nor the Crassula shown at the previous meeting by Dame Alice Godman, collected in South Africa, had so far been identified.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and nine other members present.

Exhibit.

Lady Leconfield, Petworth Park, Petworth: Labrador Kale.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Army Vocational Training Centre, Chisledon, for Cinerarias and Hippeastrums.

To Messrs. Bath, Wisbech, for Daffodils, Tulips, etc.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.

Banksian Medal.

To Mr. F. Everitt, Enfield Lock, for Hippeastrums and Clivias.

To Messrs. Low, Enfield, for Carnations.

To Mrs. R. S. Stroyan (gr. Mr. S. Wilson), Cobham, for *Primula obconica.*

To Messrs. Wakeley, London, for Hyacinths.

Award of Merit.

To Freesia ' George Washington ' (for cutting) (votes 10 for, 5 against), from Messrs. G. H. Hageman, Heemstede, Holland. See p. 229.

Other Exhibits.

Mr. F. Everitt, Enfield Lock : Hippeastrum ' The Bride ' (**A.M.** 1926).

Messrs. Hageman, Heemstede, Holland : Freesia ' Apothéose ' (**A.M.** 1921), and after trial at Wisley (**A.M.** 1927).

Lionel de Rothschild, Esq., Exbury : Hippeastrum ' Blushing Bride.'

Mrs. Sankey : Primroses.

J. E. H. Stooke, Esq., Hereford : seedling Freesias.

Messrs. van Bourgondien, Hillegom, Holland : Freesia ' Orange Glory.'

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Waterer, Bagshot, for Japanese Cherries.

Silver-gilt Banksian Medal.

To Messrs. Hillier, Winchester, for flowering trees and shrubs.

Silver Lindley Medal.

To Frank Barker, Esq., Stevenage, for a collection of varieties of *Primula Allionii.*

Silver Flora Medal.

To Messrs. Cheal, Crawley, for flowering trees and shrubs.

To Messrs. Hollamby, Groombridge, for flowering trees and shrubs.

To Knap Hill Nursery, Woking, for flowering trees and shrubs.

To Messrs. Notcutt, Woodbridge, for flowering trees and shrubs.

To Messrs. Russell, Windlesham, for greenhouse foliage plants.

To Messrs. Russell, Windlesham, for flowering trees and shrubs.

To Messrs. Wood, Taplow, for flowering trees and shrubs.

Silver Banksian Medal.

To Messrs. Elliott, Stevenage, for Saxifrages and Primulas.

To Mr. E. Ladhams, Elstead, for rock garden plants and shrubs.

To Messrs. Stuart Low, Enfield, for Camellias.

Lindley Medal.

To Messrs. Perry, Enfield, for species of Arisaema.

Flora Medal.

To Brookside Nurseries, Oxford, for Saxifrages and other rock garden plants.

To Messrs. Gill, Penryn, for Rhododendrons.

To Messrs. W. G. Haskins, Bournemouth, for flowering shrubs.

To Messrs. Jackman, Woking, for flowering shrubs.

To Messrs. Waterer, Twyford, for rock garden plants.

Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for varieties of *Veltheimia capensis.*

To Hocker Edge Gardens, Cranbrook, for rock garden plants and shrubs.

To Mr. J. Klinkert, Richmond, for clipped trees.

To Letchworth Plants, Ltd., Letchworth, for rock garden plants.

To Messrs. Maxwell & Beale, Broadstone, for rock garden plants.

To Messrs. Prichard, Christchurch, for rock garden plants.

To Mr. G. Welch, Cambridge, for rock garden plants.

First-class Certificate.

To ***Prunus cerasifera nigra*** as a hardy flowering tree (votes unanimous), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 231.

Award of Merit.

To *Gladiolus alatus* as a flowering plant for the cool house (votes 17 for), from T. T. Barnard, Esq., Wareham. See p. 229.

To *Magnolia Dawsoniana* as a hardy flowering tree (votes unanimous), from M. P. Williams, Esq., Lanarth, St. Keverne. See p. 230.

To *Prunus* 'Pandora' as a hardy flowering tree (votes 18 for), from Messrs. Waterer, Bagshot. See p. 231.

To *Viburnum Tinus*, Exbury var., as a hardy flowering shrub (votes 12 for, 6 against), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 231.

To *Viburnum Tinus hirtum* as a hardy flowering shrub (votes 14 for), from F. C. Stern, Esq., Goring-by-Sea. This award was recommended, subject to verification of name, on January 12, 1937, and is now confirmed. See p. 231.

Other Exhibits.

Abercorn Nurseries, Chelmsford : rock garden plants.
Alpine Gardens, Findon : rock garden plants.
Alpine Nurseries, West Moors : rock garden plants.
T. T. Barnard, Esq., Wareham : *Gladiolus carinatus, G. bicolor, Moraea pavonia.*
Messrs. Burkwood & Skipworth, Kingston : flowering shrubs.
Messrs. Cheal, Crawley : rock garden plants.
Chez Nous Nurseries, Newick : rock garden plants.
Mr. A. Corderoy, Eltham : rock garden plants.
Draycott Flower Farm, Campden : rock garden plants.
Messrs. Feilden & Crouch, Wrotham : rock garden plants.
Lt.-Col. Grey, Cranbrook : *Fritillaria japonica.*
Messrs. Gurteen & Ritson, Horley : flowering shrubs.
Mr. K. W. Harle, Lower Basildon : succulents.
Mrs. Hopkinson, Coulsdon : rock garden plants.
Marsden Nurseries, Ashstead : rock garden plants.
Lt.-Col. Messel, Handcross : *Orchis italica.*
Orchard Neville Nurseries, Baltonsborough : rock garden plants.
Messrs. Reuthe, Keston : flowering shrubs.
Messrs. Rogers, Southampton : rock garden plants.
Messrs. Russell, Windlesham : *Prunus Persica* 'Windle Weeping.'
Messrs. Southgate, New Malden : succulents.
Waterperry School of Horticulture, Oxford : rock garden plants.
White House Gardens, Abergavenny : rock garden plants.
Mr. G. G. Whitelegg, Chislehurst : *Syringa* 'Sensation.'

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and eighteen other members present.

Awards Recommended :—

Gold Medal.

To Baron Bruno Schröder, Englefield Green, Surrey, for a group of Cymbidiums.

To G. P. Harben, Esq., Hillstone, Totton, Hampshire, for a group of Cymbidiums.

First-class Certificate.

To *Cymbidium* × 'Janette' var. 'Memoria Mrs. A. McBean' (*Alexanderi* × 'Joy Sander') (votes unanimous), from Messrs. McBean, Cooksbridge. See p. 229.

Award of Merit.

To ***Dendrobium dicuphum album*** (votes 12 for, 4 against), from Messrs. Sanders, St. Albans. See p. 229.

Cultural Commendation.

To Mr. B. Hills, Orchid grower to Lionel de Rothschild, Esq., Exbury, Southampton, for *Cattleya amethystoglossa*, with a spike of more than 20 flowers.

To Messrs. McBean, Cooksbridge, for *Cymbidium* × 'Cremona' var. 'Black Prince,' an unusually robust plant, bearing two spikes, with 14 and 9 flowers respectively.

Other Exhibits.

Messrs. Sanders, St. Albans : a group of Orchids.
Messrs. Charlesworth, Haywards Heath : a group of Orchids.
Messrs. Stuart Low, Jarvis Brook : a group of Orchids.

Messrs. Armstrong & Brown, Tunbridge Wells : a group of Orchids.
Messrs. J. & A. McBean, Cooksbridge : a group of Orchids.
Messrs. H. G. Alexander, Tetbury : a group of Orchids.
Sir William Cooke, Bart., Newbury : Cymbidiums.
Hon. H. S. Tufton, Englefield Green : Cymbidiums.
The Lady Leconfield, Petworth : *Dendrobium* × *Ainsworthii.*

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

To the Trenoweth Valley Flower Farm, Ltd., St. Keverne, for exhibit of Daffodils.

To Messrs. Dobbie, Edinburgh, for an exhibit of Tulips.

Silver-gilt Banksian Medal.

To Messrs. Barr, 11 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

To Mr. R. F. Calvert, Coverack, Helston, Cornwall, for an exhibit of Daffodils.

Silver Flora Medal.

To the Berrow Bulb Farm, Burnham-on-Sea, for an exhibit of Daffodils.

To the Donard Nursery Co., Newcastle, Co. Down, for an exhibit of Daffodils.

Silver Banksian Medal.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Flora Medal.

To Messrs. D. Stewart, Wimborne, for an exhibit of Daffodils and Tulips.

Banksian Medal.

To Messrs. H. Prins, Wisbech, for an exhibit of Tulips.

Award of Merit.

To *Narcissus* ' Penvose ' as a variety for exhibition (votes 16 for, 1 against). Raised by the late P. D. Williams and shown by Mr. M. P. Williams, Lanarth, St. Keverne. See p. 230.

To *Narcissus* ' Grace Moffat ' as a variety for exhibition (votes unanimous). Raised and shown by Major G. H. Johnstone, Trewithen, Grampound Road, Cornwall. See p. 230.

Other Exhibits.

Messrs. Kelway, Langport : Daffodils.
Mr. G. S. Crouch, Fairseat Nurseries, Wrotham : *Narcissus* ' Fairy Wings.'
Lt.-Col. C. H. Grey, Hocker Edge, Cranbrook : *Tulipa saxatilis cretica.*
Mr. A. Gray, Penpol, Devoran, Truro : three hybrids obtained from *Narcissus Jonquilla* × *N. triandrus*, *N.* ' Miss Willmott ' × *N. minimus* and *N.* ' John Evelyn ' × *N. dubius.*

JOINT RHODODENDRON COMMITTEE.—Mr. W. J. Bean, V.M.H., in the Chair, and twelve other members present.

Award Recommended :—

Award of Merit.

To *Rhododendron* × ' Eureka ' (*R. arboreum* × *R. Hookeri*), as a hardy flowering plant (votes unanimous), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 231.

Other Exhibits.

Lionel de Rothschild, Esq. : *R. eclecteum*, *R. sutchuenense Geraldii*, and *R. fulvoides*, all shown as hardy flowering shrubs for the woodland garden.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. F. C. Stern, F.L.S., in the Chair, and nine other members present.

Awards Recommended :—

Award of Merit.

To *Ranunculus calandrinioides* as a hardy flowering plant for the rock garden (votes 7 for), from F. C. Stern, Esq., F.L.S., Highdown, Goring-by-Sea. See p. 231.

Cultural Commendation.

To the Director, Royal Botanic Gardens, Kew, for a well-grown plant of *Arcterica nana* (A.M. 1924).

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1938.

Aberconway, Lord, Bodnant, Tal-y-Cafn; seeds of climbing plant from Natal; bulb of *Hippeastrum Ackermannii*. Abraham, Mrs. S. L., Micheldever; seeds of *Brayera anthelmintica*. Ahrendt, Rev. L. W. A., Soho, W. 1; cuttings of *Berberis* 'Bountiful.' Algiers Botanic Garden, N. Africa; collection of seeds. Allwood Bros., Haywards Heath; collection of fifty plants of Border Carnations. Alma-Ata Botanic Garden, U.S.S.R.; collection of seeds. Ames, J., Aberdeen; grafts of Apple 'Hood's Supreme.' Arnold Arboretum, Mass., U.S.A.; plants of Rehderodendron and *Viburnum acerifolium*. Arnold, Mrs. C., California; seeds of *Hesperocallis undulata*. Baggesens Nurseries, Ltd., Pembury; collection of seedling Chinese shrubs. Bailey, Dr. L. H., Cornell Univ., New York; 100 sheets of specimens for Herbarium. Baker, G. P., Sevenoaks; corms of Crocus and Tulipa; plant and cuttings of *Cytisus demissus*; collection of seeds. Baker, Mrs. H. C., Bristol; grafts of Chimonanthus and Diospyros. Baker, H. L. P., Crewkerne; seeds of blood-red var. of *Rhododendron arboreum*. Balls, E. K., Exped. (see also under Edinburgh); collection of bulbs, tubers, plants and seeds from Mexican expedition. Barnard, P. G., Upper Burma; seeds of Aristolochia, Cassia and Gloriosa. Barnard, T. T., Wareham; corms of *Gladiolus psittacinus* var. *Hookeri*. Barr & Sons, Covent Garden; bulbs of Scilla, Romulea and Narcissus species. Bates, W., Wokingham; plant of *Prunus subhirtella* var. *autumnalis rosea*. Beall, C., Univ. Coll., W.C. 1; seeds of *Nelumbo luteum*. Beck, Miss, Ware; seeds and bulbs of Fritillaria species. Belderson, N. J., Enfield; seeds and plants of Ammophila. Bellew, Miss, Farnham Common; bulbs from Madeira. Berlin Botanic Garden; collection of seeds. Berry, Mrs. D., Newport; bulbs of Lily for identification. Blossfeld, R., Potsdam; seeds of Gloxinia and Primulas. Bodger Seeds Ltd., California; seeds of annual Giant-flowered Scabious. Bolton, F. E., Cyprus; corms of Cyclamen species for identification. Booth, F. H. A., Chiddingfold; plants of *Pentstemon grandiflorus*. Boothman, H. S., Maidenhead; collection of seeds of alpine plants; plants of Campanula, Draba and Townsendia; copy of The Alpine House for the library. Britton, Miss E. A., Tiverton; collection of seeds of New Zealand alpine plants; plants for rock garden. Brooke, Miss R. D., Straffan; plant of red Polyanthus. Brooklyn Botanic Garden, New York; collection of seeds. Brown, E., Cranleigh; cuttings of *Veronica Bernettii*. Brown, F. C., Wisley; plant of *Ceropegia debilis*. Buitenzorg Botanic Garden, Java; seed of *Primula imperialis*. Bunyard, E. A., Maidstone; plants of *Rosa sp.* Butt, W., Chalford; plants of *Sorbus sp.* Button, C., Cranham; seeds of Canarina, Gladiolus, Lobelia and Lupinus; plants of Androsace and Saxifraga. Byng of Vimy, Viscountess, Thorpe-le-Soken; collection of Oxalis species; seeds of *Lathyrus splendens*. Cahen, L., Marlow; seeds of Coffea and Stapelia species. Campbell, D., Pinpont, Dumfries; fifty plants of Strawberry 'Campbell's Seedling.' Carylon, Capt. E. T., Par, Cornwall; collection of fourteen varieties of *Camellia japonica*. Carters Tested Seeds Ltd., Raynes Park; seeds of *Coleus Frederici* and of eight varieties of Gourds. Cassidy, W. V., Cardiff; plants of Falcaria and Conophytum; cuttings of shrubs. Caulfield, Mrs. D. L., London; cuttings of red and white Roses for propagation. Champion, A. G., Orpington; plants of Ipomoea and leguminous shrub. Charrington, E., Limpsfield; plant of *Erigeron leiomerus*. Chittenden, F. J., Vincent Sq.; fruits of shrub, possibly *Ligustrum sp.*; bulb and seeds of *Brunsvigia sphaerocarpa*; seeds of Clerodendrum. Christy, W. M., Chichester; plants of seven Helianthemums. Churchill, Mrs. A., Camberley; corms of New Zealand Gladioli. Clarke, Col. Stephenson R., Haywards Heath; plants of eight species of Quercus. Clavering, Sir A., Westminster, S.W. 1; trees of Plum 'Maglio.' Coimbra Botanic Garden, Portugal; collection of seeds. Coleridge, Mrs., Ottery St. Mary; cuttings of *Syringa vulgaris* 'Masséna.' Collins, G. E., Hanworth; plant of Rose for identification. Constable, Messrs. W. A., Tunbridge Wells; plants of *Alstroemeria Ligtu* var. *angustifolia* hybrids. Cooke, R. B., Corbridge-on-Tyne; collection of seeds and plants, chiefly for rock garden. Cooper, B. F. J., Wingham; cuttings of *Veronica Goodwoodiana*. Copeland, T., Finchampstead; seeds of *Gentiana Farreri* and *Primula* species. Copenhagen University Botanic Garden; collection of seeds. Correvon, Dr. H., Geneva; collection of seeds for rock garden. Coutts, J., Woking; seeds of *Malva setosa*; cuttings of Jasminum and Solanum. Cox, E. H. M., Broughty Ferry; cuttings of Berberis and Rubus. Christchurch Botanic Garden, New Zealand; collection of seeds of native plants. Crane, Dr. F. D., Florida; seeds of *Diospyros sp.* Crane, M. B., John Innes Hort. Inst., Merton; grafts of eight seedling

Apples. Crowe, Mrs. W., Henley; seeds of Australian plants. Curwen, Rev. R. B., Arundel; plant of *Buxus sempervirens* var. *rosmarinifolia*. Cuthbert, J., Hove; corms of Tulipa species and Gladiolus. Danks, F. M., Australia; seeds of Reinelt strain of Delphiniums. Desborough, Capt. A. P. M., Broadstone; seeds of Clematis and Meconopsis. Dobbin, Mrs. M. A., Blackshiels; plant of *Cytisus decumbens* and *Daphne Mezereum*; collection of seeds. Donard Nursery Co., Co. Down; plant of *Mahonia napaulensis*. Doorenbos, S. G. A., Holland; plants of hybrid Malus, Elaeagnus and other shrubs. Druitt, Mrs. A., Christchurch; cuttings of seedling *Cytisus scoparius* forms. Dunedin Botanic Garden, New Zealand; collection of seeds of native plants. Dunn, G. S., Redbourn; 100 plants of Strawberry 'Redbourn.' Durham, F. R., Vincent Sq.; seeds of Brown Beans. Dyer, P., Leigh; two plants of *Cytisus albus*. Earle, Mrs. M., Busbridge Hall; seeds of *Abies Forrestii*. Edge, Mrs. A., Nyasaland; seeds of Caesalpinia and *Mina lobata*. Edinburgh Royal Botanic Garden; collection of plants, cuttings and seeds; of plants, bulbs and seeds from E. K. Balls' Expedition to Mexico; of seeds from Capt. Sherriff (Bhutan and S.-E. Tibet) and Prof. Hu (China). Edwards, J. E., Gibraltar; seeds and corms of *Colchicum Bivonae*; seeds of hybrid Cistus, of Narcissus and Viola species. Edwards, L., New Milton; seeds of *Cupressus Lindleyi*. Erskine, Capt. E., Khartoum; seeds of *Bauhinia reticulata*. Falconer, A., Stalybridge; 100 plants of *Lobelia fulgens* 'Queen Victoria Improved.' Fenwick, M., Stow-on-the-Wold; collection of plants for Alpine meadow; plants of *Nerine Bowdenii*; seeds of Alnus, Gentiana, Meconopsis; cuttings of Pentstemon and Rhododendron. Fincham, A. A., Goff's Oak; plants of Phlox. Findlay, H., Cobham; seeds of *Cytisus racemosus*; cuttings of *Ilex cornuta*. French, Col. C. M., Farnham; plants of *Myrtus Ugni*. Gardner, Hon. Mrs. A., Worplesdon; seeds of Nikau Palm and Swan Shrub. Garnett-Botfield, Mrs., Wolverhampton; plants of *Rhodohypoxis Baurii* 'Apple Blossom' and pink form. General Electric Co., Kingsway, London, W.C. 2; electrically heated garden frame with connexions. Gibbs, Mrs., W. 2; seeds (? Acacia species) from Egypt, and of Cupressus from Italy. Glasnevin Botanic Garden, Dublin; plant of *Arisaema candidissimum*; collection of seeds. Goode, F., Epsom; plant of Saxifrage. Gould, B. J., Sikkim; roots and seeds of *Rheum inopinatum*. Gray Herbarium, Harvard Univ., U.S.A.; 350 sheets of herbarium specimens. Gray, Dr. R., Hindhead; collection of South African Heaths. Green, D. E., Send Marsh; plants of Kniphofia. Green, H., Maidstone; seedlings of *Pittosporum undulatum*. Grubb, N. H., East Malling; plants of ten seedling Raspberries. Guichard Sœurs, Nantes; plants of *Grevillea hybrida* and *G. glabra*. Gunner, D., Victoria, Australia; seeds of 'Gartford Giant' Iceland Poppies. Hadden, N. G., West Porlock; collections of seeds and cuttings, chiefly of shrubs. Hall, Sir D., John Innes Hort. Inst., Merton; bulbs of eleven species of Tulipa. Hambro, R. O., Fort Augustus; plants of *Gentiana gilvostriata*. Hanbury, the late Sir C., La Mortola; collection of seeds. Hardie, J. F., Dunkeld; tubers of Potato. Harley, A., Kirkcaldy; seeds of Meconopsis and Nomocharis species. Harris, Mr., Wooler; collection of herbaceous plants; plants of Raspberries and Strawberry; scions of Plum 'The Kirk'; Cherry stocks. Harrison, A. T., Glasgow; plants of *Lomatia ferruginea*. Hawker, Capt. H. G., Ermington; seeds of *Lilium giganteum*. Hawkins, L., Elstree; seeds of Gentiana and Linum; plants and cuttings of *Lychnis Viscaria plena*. Hayward, W., Winter Park, Florida; seeds of Diospyros, Erythrina, Aristea and other plants; bulbs of Leucocoryne, Caladium and Cyrtanthus. Henderson, C. W., East Croydon; seeds of white form of *Salvia pyramidalis*. Henley, J. W., Thorpe Bay; grafts of Apple. Hill, C. F., Hillingdon; seeds of *Hibiscus esculentus*. Hillier, Messrs., Winchester; plants of four species or hybrids of Rosa. Hilling, Messrs. T., Chobham; collections of plants for the rock garden. Hobbiss, W., Worcester; grafts of Plum 'Willingham Gage.' Holmes, W. G., Tain; seeds of Parsley 'Wuschelkopf. Holding, J., Evesham; plants of Ceanothus and Dianthus. Hu, Prof.; collection of seeds from expedition in China. Humphreys, Dr. G. N., Southsea; seeds of *Clematis orientalis* var. Inglis, Mrs., Holywood; seeds of *Tricuspidaria lanceolata*. Ingram, C., Benenden; seeds of three species of Puya. Ingwersen, W. E. Th., East Grinstead; collection of seeds and plants from Albania. Irvine, W. L., Bromborough; plant of *Dracocephalum nutans*. Izard, J. P., Wembury; cuttings of *Viburnum rhytidophyllum roseum*. Jackman, G., & Sons, Woking; cuttings of Ribes. Jardine, C. A., Feltham; seeds of *Viola lutea* × *V. gracilis*, and *V. aetolica*. Jekyll, F., Godalming; plants of *Silphium perfoliatum*; seeds from Mt. Athos. Jenkin, Dr. N. W., Hindhead; seedlings of *Ranunculus calandrinioides* and *Pentstemon acaulis*. Johnson, W., Aylesbury; plants of *Cattleya eximia*. Johnson, Rev. W. R., St. Ervan, Cornwall, collections of New Zealand and S. African seeds. Johnstone, G., Grampound Road, Cornwall; plants of *Magnolia globosa* and *M. mollicomata*. Jonas, A. C., Fordingbridge;

seeds of *Paeonia lutea* and *Primula Poissonii*. JUDD, W., Arnold Arboretum, U.S.A.; native plants of *Viburnum acerifolium*. KEW ROYAL BOTANIC GARDENS; collection of seeds; plants for rock garden; cuttings of shrubs; seeds of *Fritillaria Roylei*. KITCAT, S. A. P., Esher; plants of *Mahonia japonica*. LADHAMS, E., Elstead; collections of plants for rock garden and Floral Dept., including forty-two varieties of Pinks. LANSDELL, F., Brighton; plants of *Aubrietia* 'Alice Lansdell' and *Crassula impressa*. LAWRENCE, Lady, Dorking; plants of *Scilla sp.*; *Strobilanthes isophyllus*; and *Fabiana violacea*. LAXTON Bros., Bedford; trees of three varieties of Apples, one Pear, and one Plum; bushes of Blackcurrant 'Standard.' LEMPERG, Dr. F., Austria; collections of seeds and plants from Albania and Macedonia; plants for rock garden and seedling shrubs. LEXINGTON BOTANIC GARDEN, U.S.A.; collection of seeds. LLOYD BOTANIC GARDEN, India; collection of seeds. LOBJOIT, Sir W., High Wycombe; grafts of Plums 'Bountiful' and 'September Prolific.' LOCKE, Mrs. E., Dorking; plants of *Geranium* sp. and *Leiophyllum buxifolium*. LOFTHOUSE, T. A., Middlesbrough; seeds of Meconopsis and Primula. LONG, E., Salcombe; seeds of *Magnolia Campbellii*. LONG, Mrs., Rugby; plants of coloured Primrose and form with foliaceous sepals. LOWNDES, Major D. G., Ringwood; seeds of Meconopsis and Primula from Sikkim, and of *Ipomaea Bona-nox*. LYNCH, R. I., Dartington Hall; plants of *Lithospermum* 'Grace Ward.' LYTTEL, Rev. Prof. E., Southampton; plants of Anopterus, Teucrium, Philesia, etc. MACEWAN, Miss R., Bembridge; cuttings of thirteen Pelargoniums. MACHIN, Sir S., Weybridge; grafts of Apple 'Cleeve.' MAGOR, E. J. P., St. Tudy; collection of seeds of Japanese plants; seedlings of *Rhododendron Albrechtii*, Menziesia, and Vaccinium. MAHLER, Mrs. H., Conway; plants of *Cytisus sessilifolius* and three forms of *Viola gracilis*. MAPPIN, E. R., New Zealand; seeds of *Leptospermum Keatleyi*. MARCHANT, W. J., Stapehill; plants and cuttings of various shrubs, including *Calluna vulgaris* 'H. E. Beale'; seeds of *Viburnum setigerum*. MARSH, J. W., Woking; seeds of 'Mystery Fruit' (? Cydonia). MARTINEAU, Lady, Virginia Water; seeds of *Nolana* sp. MAYDON, Mrs. D., Bourton, Dorset; seeds of Hibiscus, Iris and Ixora from Hong-Kong. MEDHURST, Mrs., New Zealand; seeds of native plants. MEYER, Canon R., Little Gaddesden; seeds of Canna and Belamcanda; plants of *Muscari* sp. MICHIGAN, UNIVERSITY OF, U.S.A.; collection of shrub seeds. MILLARD, F. W., Felbridge; seeds for rock garden. MIRLEES, Mrs. E. S., Guildford; plant of Manchurian Apricot. MISSOURI BOTANIC GARDEN, U.S.A.; sixty-one sheets of herbarium specimens. MITCHELL, Miss, Boston; corms of Gladiolus. MOORE, H. ARMYTAGE, Saintfield, Co. Down; plants of *Escallonia* 'Wm. Watson,' and *E. rubra compacta*. MOORING, E. W., Godalming; seeds of *Acacia dealbata*. MORTON ARBORETUM, U.S.A.; grafts of Malus, Pyrus and Prunus species; collection of shrub seeds. MOSCOW UNIVERSITY BOTANIC GARDEN; collection of seeds. MOWAT, J. L., St. Andrews; plant of *Cotyledon Scheideckeri cristata*. MULLIGAN, B. O., Wisley; cuttings of *Pentstemon Scouleri*. MULLIGAN, Mrs., Belfast; cuttings of hybrid Cotoneaster and *Lonicera grata*. MUNSON, G. H., Colchester; plant of *Aubrietia Munsonii variegata*. MUSGRAVE, C. T., Godalming; seeds of *Mutisia decurrens* and *Primula deorum*; seedlings of Androsace and Hellebores; bulbs of *Leucojum hyemale*. NOTCUTT, R. C. (Exors. of the late), Woodbridge; plants of various shrubs, including Olearia, Calycotome, and Wistaria. OGILVIE, GRANT M., Knightsbridge; collection of seeds from Greece, including five species of Fritillaria. OLDHAM, W. R., Windlesham; seeds of crimson Aquilegia. OPPENHEIMER, Sir F., London, S.W. 1; seeds of *Cassia renigera*. OSLO BOTANIC GARDEN; collection of seeds. PACK-BERESFORD, Lt.-Col., London, W. 1; seeds of hybrid Rhododendrons. PAGE, COURTNEY, Haywards Heath; collection of thirteen species of Rosa. PALMER, Hon. L., West Hoathley; plants of *Celtis Sellowiana* and *Buddleia grandiflora*; seeds of Meconopsis. PARIS NATURAL HISTORY MUSEUM; collection of seeds. PENNELL, J., Kingston Hill; collection of seeds. PIKE, A. V., Heathfield Park; cuttings of Ampelopsis and Vitis; seeds of Jasminum. PLATT, J. W., Elstead, Godalming; seeds of *Berberis hypokerina*. PORTER, G. P., West Moors; collection of plants for the rock garden. PULHAM, J. R., London, W. 1; seeds of *Olearia Cheesemanii*. REED, Mrs. W., East Grinstead; plants and seeds of *Caesalpinia* sp. RICHMOND, Mrs., Camberley; seeds of 'Foochow Creeper.' RIVERS, Messrs. T. & SON, Sawbridgeworth; collection of ten Sweet Briar hybrids, and plants of four other varieties of Roses. ROBB, E., London, W. 1; seeds from Cyprus. ROBERTS, Dr., Ottershaw; plants of Sedum and Oxalis species. ROBINSON, G. W., Chelsea; plants of Dracocephalum; seeds of Geranium. ROBSON, L., Guildford; seeds of yellow-flowered Clematis. ROGERS, R. B., Launceston; seeds of Stapelia and *Primula chionantha*; seedlings of *Primula nutans*. ROME BOTANIC GARDEN; collection of seeds. ROSE, F. J., Southampton; seeds of Lilium and Magnolia species. ROSENHEIM, P., East Molesey; seeds of rock garden plants and of *Paeonia Bere-*

sowskyi. Rothschild, Lionel de, Exbury; plants of six varieties of Korean Chrysanthemums; collection of seeds. Russell, Messrs. L. R., Windlesham; plant of variegated Veronica. Russell, Mrs. R. M., Jersey; collection of New Zealand seeds. Sanderson, Rev. F., Malvern; seeds of Shirley Poppy, blue shades. Scott, Mrs. H., Haslemere; bulbs of *Zephyranthes grandiflora.* Scrase-Dickins, C., Horsham; plants of Pieris, Rhododendrons, Camellia, etc. Sheldon, W. G., Oxted; plants for rock garden. Sherrard, Capt. J. O., Newbury; cuttings of *Rosa Ecae.* Sherriff, Capt. G. (see also under Edinburgh); collections of seeds and bulbs from Bhutan and S.E. Tibet. Shore, Mrs., Frome; plant of *Cordyline australis.* Sibpur Royal Botanic Garden, Nr. Calcutta; seeds of *Anemone Falconeri.* Skinner, H. T., Cornell Univ., U.S.A.; seeds of *Rhododendron calendulaceum* form. Smith, Mrs. Lindsay, Chilworth; collection of seeds from Kenya; plants of *Lilium longiflorum* var.; and *L. philippinense.* Smith, Sir W. W., Edinburgh; plant of *Eriocaulon septangulare.* Sopper, Lt.-Col. F., Gorthleck; seeds of Primula and Meconopsis and other plants. Speir, Col., North Berwick; cuttings of plants from Corsica. Starkey, W., Torquay; plant of *Ormosia Hosiei.* Stebbing, Mrs. H. B., Staplefield; seeds of *Meconopsis betonicifolia* form. Stern, Major F. C., Goring-by-Sea; seeds of three Lilies; quantity of bulbs of *Iris tingitana Fontainesii*; plants of *Mutisia coccinea,* five species of Erica, etc. Stoker, Dr. F., Loughton; seeds of *Meconopsis superba.* Streeter, F., Petworth Park; grafts of Apple 'Sussex Pippin.' Stuttaford, Rev. J. I., Exmouth; seeds of Meconopsis from Kurdistan. Sutton & Sons, Ltd., Reading; seeds of *Kniphofia Snowdenii.* Swainson, Col. F. E., Portcatho, Cornwall; roots of Dahlia from Ootacamund. Taranto Villa Gardens, Italy; collection of seeds. Thomas, G. W., Heamoor, Penzance; cuttings of Gordonia, Bowkeria and hybrid Passiflora. Thompson, A. S., Knaresborough; seeds of *Dianthus superbus* var. *monticolus.* Thompson, Mrs. H. P., Weybridge; plant of Cheilanthes and Salvia. Thorne, Capt. G. G., Godalming; plants of Australian 'Bird Bush.' Thorrington, F. W., Paignton; cuttings of *Erysimum* × Wallflower. Toronto, University of, Canada; seeds of Cornus, Rhus and Rubus species. Trapman, L. A., Tunbridge Wells; seeds of *Chionanthus retusus* and *Symplocos paniculata.* Tropical Research, Pan American Society of, U.S.A.; seeds of 'Yerba de la Pulga.' Trotter, R. D., Ockley; bulbs of *Crocus speciosus*; plants of Abies, Caltha, Scilla, Ruscus, etc.; seeds of many Crocus species and varieties of Ruscus, Daphne, Viburnum, and Tulipa species. Troup, Capt. R. D., Dorchester; seeds of Oxypetalum. U.S.S.R. Academy of Science, Far Eastern Branch; collection of seeds of trees and shrubs. U.S.S.R. All-Union Scient. Res. Knst. Medic. Pl.; collection of seeds. Vandervere, E., San Francisco; grafts of *Rhododendron Griersonianum* × *R. occidentale.* van Vleuten, D. B., Holland; buds of Plums 'Ruth Gerstetter' and 'Luthel Sachser.' Veitch, A. C., Byfleet; collection of books for library. Wageningen Arboretum, Holland; collection of tree and shrub seeds. Wallace, Mrs. F. L'E., Buenos Aires; seeds of *Mutisia ilicifolia.* Wallace, R. M., Australia; bulb of hybrid Lily. Warburg, E., Headley; cuttings of Ceanothus, Ephedra and *Lonicera tragophylla.* Warre, Capt., Sunningdale; plants of *Mahonia lomariifolia,* Osteospermum, Prunus and Teucrium. Washington University Abroretum, U.S.A.; collection of seeds. Waterer, Sons & Crisp, Bagshot; collection of shrubs, including Cotoneaster, Hamamelis, Rhus and Styrax. Watkins & Simpson, London, W.C. 2; collection of over sixty packets of seeds of annuals; seeds of *Lagerstroemia* sp. Watson, Messrs. W., Dublin; plants of Ceanothus, hybrid Berberis and Cytisus. Watts Williams, Mrs., Kenya; seeds of bulbous plants; corms of unknown plant; four pots of plants from Kenya. Weeks, A. G., Limpsfield; collection of plants for rock garden; seeds of Saponaria and Solenomelus. Weiss, Prof. F. E., Guildford; book for library. Welcome, Miss J., Slough; seeds from Jamaica. Wellings, E. H., Chigwell; plant of *Pentstemon laetus.* West of Scotland Agricultural College, Auchincruive; plants of four seedling Strawberries. Whitney, Mrs. G. G., Milton, U.S.A.; seeds of *Cunila Mariana* var. *origanoides.* Wilkin, H. T., London, S.W. 20; plant of *Talinum* sp. Williams, Dr. A. H., Roffey; cuttings of Lonicera and Pittosporum; buds of Rosa species and hybrids; seeds of Aster, Cordyline, Phormium, etc. Williams, J. E., Cardiff; seeds of *Rhodothamnus Chamaecistus.* Wilson, Angus, Marlborough; cuttings of *Rosa chinensis* var. *monstrosa.* Wilson, G. Fox, Wisley; seeds of *Gleditschia triacanthos.* Wilson, F. Fox, Sydney, N.S.W.; samples of Australian timbers. Winterbotham, Mrs., Beaconsfield; seeds of *Campanula subidaea* (?). Wright, Mrs. D., West Clandon; seeds of *Lobelia cardinalis* (?) from Canada. Wyatt, J. W., London, S.W. 7; seeds of *Myosotidium nobile.* Young, Mrs. M. D., Camberley; seeds of 'Foochow Creeper.' Younger, H. G., Dumbar; cuttings of *Viburnum rhytidophyllum variegatum*; seeds of *Lallemantia canescens.* Ziesenhenne, R. C., Santa Barbara, U.S.A.; seeds of eleven species of Begonia.

BOOKS AND PAMPHLETS ADDED TO THE LIBRARY IN THE YEAR ENDING DECEMBER 31, 1938.

1 = Purchased.
2 = Presented by the Author.
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6 = ,, ,, Mr. W. T. Stearn.
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10 = ,, ,, The Linnean Society of London.
11 = ,, ,, The Director, Brooklyn Botanical Garden.
12 = ,, ,, Kulturnoi Svyazi s Zagranijei, Moscow.
13 = ,, ,, The Director, Royal Botanic Gardens, Kew.
14 = ,, ,, Miss A. V. Shackleton.
15 = ,, ,, Dr. David Hooper.
16 = ,, ,, Mr. F. Streeter.
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C = Bequeathed by the late Mr. Reginald Cory.

Abbreviations.—Col. pls. = coloured plates; illus. = illustrated or illustrator; ed. = edited, edition or editor; fol. = folio; transl. = translated or translator.

For books published in London, the place of publication is not named in the entry.

Abbotsbury Gardens, Catalogue of plants in. *See* [Fox-Strangways, M. E. A.].

Abel, Clarke. Narrative of a journey in the interior of China, and of a voyage to and from that country, in the years 1816 and 1817. Col. pls. Illus. 4to. 1818. (1)

Adamson, Robert Stephen. The vegetation of South Africa. Illus. 8vo. 1938. (1)

Adanson, Michel. Familles des plantes. 2 vols. Illus. 8vo. Paris, 1763. (1)

Airoles, J. de Liron d'. *See* Liron d'Airoles, J. de.

Allen, B. Sprague. Tides in English taste (1619–1800). 2 vols. Illus. 8vo. Cambridge, Mass., 1937. (1)

Allen of Hurtwood, Marjory, *Lady*. How allotments could be made an amenity asset to the community. Illus. 12mo. [1938.] (3)

American Amaryllis Society. Year Book. Vols. 1–2. Illus. 8vo. Orlando, Florida, 1934–35. *Continued as* Herbertia. Vols. 3–4. Illus. 8vo. Orlando, Florida, 1936–37. (3)

Amherst, Alicia Margaret Tyssen, later *The Lady* Rockley. Historic gardens of England. Illus. 8vo. (1938.) (4)

Anley, Gwendolyn. Alpine house culture for amateurs. With a foreword by G. P. Baker. Illus. 8vo. (1938.) (4)

Arkell, Reginald. Green fingers: a present for a good gardener. Illus. by Eugène Hastain. Illus. 8vo. (1935.) (1)

—— More green fingers . . . pictured by Eugène Hastain. Illus. 8vo. (1938.) (4)

Armbruster, Ludwig. *Ed.* *See* Dengg, O. Grosse illustrierte Bienenflora Mitteleuropas. 2nd ed.

Armstrong, Sydney Frederick. British grasses and their employment in agriculture. 3rd ed. Illus. 8vo. Cambridge, 1937. (4)

Ashby, Maurice. The genus *Hemizygia* Briquet. (Journ. of Bot., lxxiii.) Illus. 8vo. 1935. (2)

Atchley, Shirley Clifford. Wild flowers of Attica. Illus. by W. O. EVERETT. Ed. by W. B. TURRILL. Col. pls. 4to. Oxford, 1938. (4)

Avery, Amos G. *See* BLAKESLEE, A. F., & AVERY, A. G. Methods of inducing doubling of Chromosomes.

Bailey, Liberty Hyde. Manual of cultivated plants. 2nd impression. Illus. 16mo. New York, 1938. (4)

Baker, George Percival. Foreword. *See* ANLEY, G. Alpine house culture.

Barclay, D. *Illus.* *See* BOLUS, H. M. L., & others. A second book of South African flowers.

Barker, John Theodore. The beauty of flowers in field and wood . . . with their moral teachings illustrated. Col. pls. 8vo. Bath, London & Edinburgh, [18—]. (1)

Barney, Marian Greene. *Illus.* *See* EBERLEIN, H. D., & HUBBARD, C. V. D. The practical book of garden structure.

Barrett, Charles. Gems of the bush, featuring orchids, birds' eggs, etc. Orchid section in collaboration with W. H. NICHOLLS. Col. pls. Illus. 8vo. Melbourne, Austr., [193–]. (1)

Barrett, Otis W. Appendices. *See* VERRILL, A. H. Foods America gave the World.

Bartlett, Aubrey Cecil. A short history. *See* ROYAL GARDENERS' ORPHAN FUND.

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Barton-Wright, Eustace Cecil. General plant physiology. Foreword by Sir F. GOWLAND HOPKINS. Illus. 8vo. (1937.) (4)

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Beckett, Harold Edward. Nature and physical properties of glass. *See* McGRATH, R., & FROST, A. C. Glass.

Berger, Alwin. Die Agaven: Beiträge zu einer Monographie. Illus. 8vo. Jena, 1915. (1)

Bewley, William Fleming, & Harnett, Joseph. The cultivation of mushrooms. 2nd ed. Illus. 8vo. (1938.) (4)

Bitter, Georg. Die Gattung *Acaena*. Vorstudien zu einer Monographie. (Bibliotheca Bot., 74.) Illus. 4to. Stuttgart, [1910–]1911. (1)

Blakeslee, Albert F., & Avery, Amos G. Methods of inducing doubling of chromosomes in plants. (Journ. Hered., xxviii.) Illus. 8vo. Washington, D.C., 1937. (2)

Blomfield, Reginald, & Thomas, F. Inigo. The formal garden in England. 3rd ed. Illus. 8vo. 1901. (C)

Boerner, Franz, & others. Laubgehölze, Rosen und Nadelgehölze; ein Lehr-und Nachschlagewerk für die Praxis . . . unter Mitwirkung von P. PAUCK und H. VON RATHLEF. Col. pls. Illus. 8vo. Nordhausen, (1938). (1)

Bolus, H. M. Louisa, & others. A second book of South African flowers. Text by H. M. L. BOLUS. Paintings by D. BARCLAY. Photos by E. J. STEER. Col. pls. Illus. 8vo. Cape Town & Wynberg, 1936. (1)

Bonstedt, Carl. *Ed.* Pareys Blumengärtnerei: Beschreibung, Kultur und Verwendung der gesamten gärtnerischen Schmuckpflanzen. 2 vols. Col. pls. Illus. 8vo. Berlin, 1931–32. (1)

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Bowles, Edward Augustus. Foreword. *See* PERRY, F. Water gardening.

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Cansdale, George Soper, & others. The black poplars [*Populus*] and their hybrids cultivated in Britain. Illus. Oxford, 1938. (1)

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Cesati, Vincenzo. Stirpes Italicae rariores vel novae descriptionibus iconibusque illustratae. Illus. fol. Milan, 1840[–43]. (1)

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Clarici, Paolo Bartolomeo. Istoria e coltura delle piante . . . con un copioso trattato degli agrumi. 4to. Venice, 1727. (1)

Clouston, David. The establishment and care of fine turf for lawns and sports ground. Illus. 8vo. Aberdeen, (1937). (4)

Clute, Ida Martin. *Illus.* *See* CLUTE, W. N. Our ferns ; their haunts.

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Colla, Aloysius. *See* COLLA, LUIGI.

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Commission Pomologique Romande. Nouvelle pomologie romande illustrée : description des meilleures variétés de fruits à cultiver en Suisse romande. Col. pls. Illus. 8vo. Neuchatel, 1937. (1)

Cronbach, Werner. Die Walnuss (*Juglans regia*) und ihre Sorten im Schrifttum. (Quellen zur Geschichte des Gartenbaus.) Illus. 8vo. Frankfurt a.d. Oder & Berlin, (1938). (1)

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Den Ouden, P. *See* OUDEN, P. DEN.

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Diels, Ludwig. Beiträge zur Kenntnis der Vegetation und Flora von Ecuador. (Bibliotheca Bot., 116.) Illus. 4to. Stuttgart, 1937. (1)

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Domin, Karel. Trinidad and the West Indies. (Totius Orbis Flora Photogr., i.) 8vo. Brno, 1929. (6)

Driscoll, Ethel. *Illus.* *See* HAMER, A. H. Wild flowers of the Cape.

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Du Mont de Courset, Georges Louis Marie. Le botaniste cultivateur. 2nd ed. 7 vols. Illus. 8vo. Paris, 1811–14. (1)

Dunthorne, Gordon. Flower and fruit prints of the 18th and early 19th centuries, their history, makers and uses, with a catalogue raisonné of the works in which they are found. Col. pls. Illus. 4to. 1938. (1)

Dutton, Ralph. The English garden. Col. pl. Illus. 8vo. (1937.) (1)

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Eaton, Amos. Manual of botany, for North America. 6mo. Albany, 1836. (1)

—— Botanical grammar and dictionary. 4th ed. 6mo. Albany, 1836. (1)

Eberlein, Harold Donaldson, & Hubbard, Cortlandt Van Dyke The practical book of garden structure and design. Illus. by MARIAN GREENE BARNEY. Illus. 8vo. Philadelphia, London & New York, 1937. (4)

Edgeworth, Michael Pakenham. Descriptions of some unpublished species of plants from north-western India. (Trans. Linn. Soc., xx.) Illus. 4to. [1846.]

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Ellis, Carleton, & Swaney, Miller W. Soilless growth of plants: use of nutrient solutions, water, sand, cinder, etc. Col. pls. Illus. 8vo. New York, 1938. (1)

Ellrodt, Theodor Christian. Schwamm-Pomona oder gemeinnützige Beschreibung der bekannten essbaren und giftigen Schwämme Deutschlands. Col. pls. 12mo. Bayreuth, 1800. (1)

Engler, Adolf. *Ed.* Das Pflanzenreich. Illus. 8vo. Leipzig. 101 (iv. 101.) Kükenthal, G. Cyperaceae—Scirpoideae—Cypereae. 1935–36. (1)

—— Das Pflanzenreich. Illus. 8vo. Leipzig. 102 (iv. 269.) Pilger, R. Plantaginaceae. 1937. (1)

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Evelyn, John. A translation attributed to. *See* Budd, F. E. 1938.

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Fairchild, David. The world was my garden : travels of a plant explorer. Assisted by Elizabeth & Alfred Kay. Illus. 8vo. New York & London, 1938. (1)

Fedtschenko, Boris A. Flora yugo-vostoka Evropeĭskoĭ chasti SSSR. Flora Rossiae austro-orientalis. Fasc. 1–4. (Acta Horti Petrop., xl, xliii.) Illus. 8vo. Leningrad, 1927–30. (1)

Field, Henry. *See* Hooper, D., & Field, H. Useful plants and drugs.

Fisher, Robert. The English names of our commonest wild flowers. 2 vols (in one.) 8vo. Arbroath, 1932–34. (1)

Foley, Daniel J. *See* McFarland, J. H., & others. Garden bulbs.

[Fox-Strangways, Mary Eleanor Anne, ***Countess of*** **Ilchester].** Catalogue of plants in Abbotsbury gardens, 1899. By M. I. [*i.e.* Mary Ilchester.] 8vo. n.d. [copy with additions to May 1907 in MS. by Joseph Benbow]. (1)

François, Edmond. Plantes de Madagascar (Mém. Acad. Malgache, xxiv.) Col. pls. Illus. 4to. Tananarive, 1937. (9)

Fritsch, Felix Eugen, & Salisbury, Edward James. Plant form and function. Illus. 8vo. 1938. (4)

Fröderström, Harald. The genus *Sedum* L. ; a systematic essay. (Acta Horti Gothoburg., v–x., Append.) Illus. 8vo. Göteborg, 1930–36. (4)

Frost, Albert Childerstone. *See* McGrath, R., & Frost, A. C. Glass.

Fuchs, Walter Heinrich. *See* Roemer, Th. E. M., & others. Die Züchtung resistenter Rassen.

Fürst, Hermann. The protection of woodlands against dangers arising from organic and inorganic causes. Transl. by John Nisbet. Col. pls. Illus. 8vo. Edinburgh, 1893. (1)

Gage, Andrew Thomas. A history of the Linnean Society of London. Illus. 8vo. 1938. (10)

Gager, Charles Stuart. Botanic gardens of the world ; materials for a history. 2nd ed. (Brooklyn Bot. Gard. Rec., xxvii. 1.) 8vo. Lancaster, Pa., 1938. (11)

Garven, H. S. D. Wild flowers of north China and south Manchuria. Illus. 8vo. Peiping, 1937. (1)

Gathorne-Hardy, Robert. Wild flowers in Britain. Illus. by John Nash. Col. pls. Illus. 8vo. (1938). (4)

Gentner, Georg. Das gärtnerische Saatgut. Illus. 8vo. Stuttgart, (1938). (4)

Gerard, Louis. Flora Gallo-provincialis. Illus. 8vo. Paris, 1761. (1)

Ghent. Jardin Botanique. *See* Mussche, J. H. Hortus Gandavensis. 1817.

Gibb, Eleanor Hughes-. *See* Hughes-Gibb, E.

Giesen, Hanns. Triuridaceae. *See* Engler, A. Das Pflanzenreich, 104 (iv. 18).

Giuseppi, Paul Leon. Preface. *See* Boothman, S. The alpine house.

(*To be continued.*)

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

MARCH 28, 1939.

ALPINE GARDEN SOCIETY'S SHOW.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. F. C. STERN, F.L.S., in the Chair, and sixteen other members present.

Awards Recommended :—

Award of Merit.

To *Epigaea* 'Aurora' as a hardy flowering plant for the alpine house (votes unanimous), from Mr. W. J. Marchant, Keeper's Hill Nursery, Wimborne. See p. 286.

To *Fritillaria Ehrhartii* as a hardy flowering plant for the rock garden (votes 12 for), from Dr. P. L. Giuseppi, Trevose, Felixstowe. See p. 286.

To *Fritillaria macrandra* (*rhodocanakis*) as a hardy flowering plant for the rock garden (votes 13 for), from Dr. P. L. Giuseppi. See p. 286.

To *Fritillaria tuntasia* as a hardy flowering plant for the rock garden (votes 9 for, 1 against), from Dr. P. L. Giuseppi. See p. 286.

To *Primula Clarkei* as a hardy flowering plant for the rock garden and alpine house (votes 16 for), from R. B. Cooke, Esq., Kilbryde, Corbridge, and Mrs. Crewdson, Helme Lodge, Kendal. See p. 288.

Preliminary Commendation.

To *Fritillaria Pinardii* as a hardy flowering plant for the rock garden or alpine house (votes 14 for), from P. Davis, Esq., St. Vincent, East Grinstead.

To *Primula chasmophila* as a flowering plant for the alpine house (votes unanimous) from T. Hay, Esq., Hyde Park.

To *Streptocarpus pusilla* as a flowering plant for the rock garden and alpine house (votes 13 for, 2 against), from Mrs. Garnett-Botfield, Beamish, Allbrighton, Wolverhampton.

Cultural Commendation.

To Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, for *Androsace glacialis.*

Selected for trial at Wisley.

Primula acaulis var. *pulchella*, from P. Davis, Esq.

Primula × 'Betty Green,' from White House Gardens, Llanfoist.

Other Exhibits.

Alpine Nurseries, Ltd., West Moors : *Pulsatilla vulgaris* var. *cernua.*

Mrs. G. Anley, Woking : *Aethionema graecum* (to be seen again).

G. P. Baker, Esq., Sevenoaks : *Narcissus* × *minicycla* (**A.M.** 1913).

Mrs. Crewdson, Kendal : *Primula Inayatii.*

P. Davis, Esq. : *Anchusa caespitosa* (**P.C.** 1938) (to be seen again), *Aristolochia longa* var. *attica, Tulipa cretica.*

E. D. Doncaster, Esq., Burley : *Narcissus aurantiacus* × *triandrus.*

Mrs. Garnett-Botfield, Albrighton, Wolverhampton : ***Fern*** (name unknown) (to be seen again).

Mrs. A. S. Griffith, Cambridge : *Adonis vernalis, Daphne Pseudo-Mezereum, Synthyris Sweetzeri, Viola koreana* (to be seen again).

The Director, R.H.S. Gardens, Wisley : *Saxifraga thessalica.*

BRITISH CARNATION SOCIETY'S SHOW.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and nine other members present.

Exhibits.

Messrs. Allwood Bros., Wivelsfield Nurseries, Haywards Heath, Sussex: Carnations ' Royal Beauty ' and ' Yellow Pelargonium.'

Captain H. Tate, Launde Abbey, Leicestershire : Carnation ' Nairne.'

APRIL 4, 1939.

SEWELL MEDAL COMPETITION.

Amateurs' Medal.

To G. H. Berry, Esq., Enfield.

Horticultural Traders' Medal.

To Messrs. Hocker Edge Gardens, Cranbrook.

A lecture was given by the Viscountess BYNG OF VIMY on " Amenable Rock Plants."

Chairman, Mr. C. T. MUSGRAVE, V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Oxalis from S. Africa.—A species of Oxalis collected by Dame Alice Godman in S. Africa, shown on March 7, had been referred to Capt. Salter, who recognized it as *Oxalis obtusa*. A form which develops a stem below the leaf rosette was called *O. cruentata* by Jacquin.

Fossil fern.—A beautiful specimen of a fossil fern-like plant was sent by Mr. A. Watson from 100 fathoms deep in the coal-measures of Northumberland, which was sent to Prof. A. C. Seward for comment.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members present.

Exhibits.

Mr. H. T. Barnett, Westwood House, Tilehurst, Berks : Apples ' Claygate Pearmain,' ' D'Arcy Spice ' and ' Rushock Pearmain.'

Samples of fruit from the South African Fruits in Season Exhibit, staged by The Imperial Fruit Show, Ltd.

FLORAL COMMITTEE A.—Mr. J. B. RIDING in the Chair, and eleven other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.
To Messrs. Sanders, St. Albans, for Anthuriums.

Silver Banksian Medal.

To Messrs. Prins, Wisbech, for Hyacinths.

Flora Medal.

To Mr. F. Everitt, Enfield Lock, for Hippeastrums and Clivias.

Banksian Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.
To Mr. J. Douglas, Great Bookham, for Auriculas.
To Messrs. Low, Enfield, for Carnations.

Other Exhibits.

Miss G. Cope, N.D.H., Chandlers Ford : Primroses.
Mr. F. Everitt, Enfield Lock : *Clivia miniata superba*.
Mr. T. B. Hart, Beaconsfield : Polyanthus.
Messrs. Low, Enfield : Rose ' Orange Triumph ' (**A.M.** 1937).
Messrs. Sanders, St. Albans : *Anthurium Rothschildianum* ' Glorious.'
Messrs. Toogood, Southampton : Polyanthus.
Miss W. Walker, Worthing : Primrose.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Waterer, Bagshot, for Rhododendrons, Cherries and other flowering trees and shrubs.

Silver-gilt Banksian Medal.

To Messrs. Hillier, Winchester, for Rhododendrons, Cherries and other flowering trees and shrubs.

To Messrs. Jackman, Woking, for Rhododendrons and other flowering shrubs.

To Knap Hill Nursery, Woking, for Cherries, Crabs and other flowering trees and shrubs.

To Messrs. Notcutt, Woodbridge, for Cherries, Lilacs and other flowering trees and shrubs.

Silver Flora Medal.

To Messrs. Cheal, Crawley, for Crabs and other flowering trees and shrubs.

To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.

To Messrs. Russell, Windlesham, for Cherries, Clematis and other flowering trees and shrubs.

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, for rock garden shrubs and plants.

Flora Medal.

To Hocker Edge Gardens, Cranbrook, for Tulips and other bulbous plants.

Banksian Medal.

To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.
To Messrs. Cheal, Crawley, for rock garden plants.
To Messrs. Constable, Southborough, for Lilies and other bulbous plants.
To Dartington Hall, Ltd., Totnes, for rock garden plants.
To Messrs. Elliott, Stevenage, for Primulas and Saxifrages.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Mr. J. Klinkert, Richmond, for clipped trees.
To Marsden Nursery, Ashtead, for rock garden plants.
To Messrs. Maxwell & Beale, Broadstone, for rock garden plants.
To Messrs. Prichard, Christchurch, for rock garden plants.
To Messrs. Southgate, New Malden, for succulents.
To Mesrs. Waterer, Twyford, for rock garden plants.

First-class Certificate.

To *Magnolia mollicomata* as a hardy flowering tree (votes 18 for), from Lord Aberconway, Bodnant. See p. 286.

Other Exhibits.

Lord Aberconway, Bodnant : *Primula sonchifolia.*
Abercorn Nurseries, Chelmsford : rock garden plants.
Messrs. Bedford & Page, Cambridge : rock garden plants.
Messrs. Burkwood & Skipwith, Kingston : flowering shrubs.
Chez Nous Nurseries, Newick : rock garden plants.
Mr. A. Corderoy, Eltham : rock garden plants.
Mrs. K. Hopkinson, Coulsdon : rock garden plants.
The Director, Royal Botanic Gardens, Kew : *Monsonia speciosa.*
Orchard Neville Nurseries, Baltonsborough : rock garden plants.
Messrs. Rogers, Southampton : rock garden plants.
Lionel de Rothschild, Esq., Southampton : *Brunfelsia calycina major.*
Messrs. Russell, Windlesham : greenhouse foliage plants.
Messrs. Waterer, Twyford : rock garden plants.
White House Gardens, Abergavenny : rock garden plants.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and eleven other members present.

Award Recommended :—

Award of Merit.

To *Odontioda* × 'Ishtar' ('Diana' × 'Monica') (votes 8 for, 3 against), from E. Kenneth Wilson, Esq., 'Cannizaro,' Wimbledon. See p. 288.

Other Exhibits.

Messrs. Charlesworth, Haywards Heath : a group of Orchids.
Messrs. Armstrong & Brown, Tunbridge Wells : a group of Orchids.
Messrs. Stuart Low, Jarvis Brook : a group of Orchids.

Mrs. G. Duveen, Limpsfield, Surrey: *Bulbophyllum nigripetalum.*
Mrs. Jervoise, Herriard Park, Basingstoke: *Cymbidium* x *Alexanderi.*
Lord Aberconway, Bodnant, Tal-y-Cafn: *Cypripedium* x 'Aricia.'
Mr. S. Farnes, East Grinstead: *Odontioda* x *sanguinea.*

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended:—

Gold Medal.

To The Trenoweth Valley Flower Farm, Ltd., St. Keverne, for an exhibit of Daffodils.

Silver-gilt Flora Medal.

To Messrs. Barr, 11, King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To Mr. R. F. Calvert, Coverack, Helston, Cornwall, for an exhibit o Daffodils.

Silver Banksian Medal.

To The Berrow Bulb Farm, Burnham-on-Sea, for an exhibit of Daffodils.

Flora Medal.

To Messrs. R. H. Bath, Wisbech, for an exhibit of Daffodils.

To Messrs. D. Stewart, Ferndown Nurseries, Wimborne, for an exhibit of Daffodils.

Banksian Medal.

To Mr. C. T. Felton, Blackgreen, St. Albans, for an exhibit of Daffodils.

First Class Certificate.

To *Narcissus* 'Brunswick' as a variety for exhibition (votes unanimous), from Mr. J. L. Richardson, Prospect House, Waterford. See p. 287.

Award of Merit.

To *Narcissus* 'Greeting' as a variety for exhibition (votes unanimous), from the Trenoweth Valley Flower Farm, Cornwall. See p 287.

To *Narcissus Watieri* as a plant for the alpine house (votes unanimous), from Mr. G. P. Baker, Hillside, Oakhill Road, Sevenoaks. See p. 288.

Other Exhibits.

Messrs. Kelway, Langport: a group of Daffodils.
Dr. D. R. Acheson, Berkeley, Gloucestershire: *Narcissus* 'Tallboy.'

The Peter Barr Memorial Cup.

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who, in the opinion of the Narcissus and Tulip Committee, has done good work of some kind in connexion with Daffodils, be awarded to the Rev. Thomas Buncombe, The Rectory, Black Torrington, Devon.

JOINT RHODODENDRON COMMITTEE.—Lord Strathcona and Mount Royal in the Chair, and nine other members present.

No Awards were recommended on this occasion.

Exhibits.

Mrs. Anley, St. George's, Wych Hill, Woking, Surrey: *Rhododendron chrysanthum* form (*to be seen again*).

W. J. Whitaker, Esq., Pylewell Park, Lymington: *R.* x 'Calthom' (*R. calophytum* x *R. Thomsonii*), and *R.* x 'Red Rover' (*R.* x 'J. G. Millais' x *R. Thomsonii*).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended:—

Award of Merit.

To *Soldanella montana* as a hardy flowering plant for the rock garden or alpine house (votes 9 for, 1 against), from F. Barker, Esq., Onosma, Stevenage. See p. 289.

Preliminary Commendation.

To *Primula flagellaris* as a hardy flowering plant for the rock garden or alpine house (votes unanimous), from Lord Aberconway, Bodnant, N. Wales.

Other Exhibits.

Mrs. G. Anley, Woking : *Aethionema graecum.*
Capt. N. G. Baguley, Banstead : *Primula* seedling found among *P. marginata.*
P. Rosenheim, Esq., East Molesey : *Fritillaria crassifolia.*

JOINT IRIS COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Exhibit.

C. J. M. Adie, Esq., King's Copse, Wentworth, Surrey : *Iris sari,* E.K.B. 2161.

April 13-14, 1939.

Daffodil Show.

Chief Awards in the Competitive Classes.

The Engleheart Challenge Cup and a Silver-gilt Flora Medal, for twelve varieties of Daffodils raised by the exhibitor.

To Mr. J. L. Richardson, Waterford.

Gold P. D. Williams Medal for the best exhibit of twelve varieties of Daffodils, Division II.

To Mr. J. L. Richardson, Waterford.

The Banksian Medal offered for the best bloom shown in the competitive classes was awarded to Mr. Guy L. Wilson, Broughshane, for a bloom of *Narcissus* ' Cantatrice.'

Early Market Produce Show.

Chief Award in the Competitive Classes.

Silver Cup to the most successful competitor.

To Capt. R. G. M. Wilson, Surfleet. } Equal First.
To Messrs. W. Barker & Son, Laleham. }

A lecture was given by Mr. Ambrose Heath on " Salads and their Making."
Chairman, Mr. E. A. Bunyard, F.L.S.

Daffodil Show.

April 13, 1939.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr, 11 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

To Messrs. J. T. White, Spalding, for an exhibit of Daffodils as packed for market.

Silver-gilt Flora Medal.

To The Berrow Bulb Farm, Burnham-on-Sea, for an exhibit of Daffodils.
To The Donard Nursery Co., Newcastle, Co. Down, for an exhibit of Daffodils.
To The Trenoweth Valley Flower Farm, St. Keverne, for an exhibit of Daffodils.
To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for an exhibit of Daffodils.
To Mr. R. F. Calvert, Coverack, Helston, Cornwall, for an exhibit of Daffodils.
To Messrs. J. R. Pearson, Lowdham, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. D. Stewart, Ferndown, Dorset, for an exhibit of Daffodils.
To Messrs. Robert Sydenham, Birmingham, for an exhibit of Daffodils.

Silver Banksian Medal.

To Messrs. Dobbie, Edinburgh, for an exhibit of Daffodils.
To Mr. C. T. Felton, Blackgreen, nr. St. Albans, for an exhibit of Daffodils.
To Messrs. H. Prins, Wisbech, for an exhibit of Daffodils.

To Messrs. Wakeley, Bankside, S.E. 1, for an exhibit of Daffodils.

To Mr. A. M. Wilson, Middlemoor Nurseries, Presteigne, for an exhibit of Daffodils.

Banksian Medal.

To Mrs. Barchard, Uckfield, for an exhibit of Daffodil seedlings.

To Mr. Peter Lower, Harpenden, for an exhibit of Daffodils.

Award of Merit.

To *Narcissus* ' Corinthian ' (from Messrs. Seymour Cobley, Ltd.), as a variety for garden decoration and for cutting from the open for market, after trial at Kirton. See p. 287.

To *Narcissus* ' Porthilly ' (from Mr. J. L. Richardson), as a variety for garden decoration and for cutting from the open for market, after trial at Kirton. See p. 288.

To *Narcissus* ' Cantatrice ' as a variety for exhibition (votes unanimous), from Mr. Guy L. Wilson. See p. 287.

To *Narcissus* ' Pepys ' as a variety for exhibition (votes unanimous), shown by Mr. J. L. Richardson. See p. 288.

To *Narcissus* ' Scapa ' as a variety for exhibition (votes 14 for, 7 against), from Mr. J. L. Richardson. See p. 288.

Preliminary Commendation.

To *Narcissus* ' Glendalough ' (votes unanimous). A large, well-formed, white giant Leedsii variety with flowers about 5 inches in diameter borne on stout 20-inch stems. Raised and shown by Mr. J. L. Richardson.

To *Narcissus* ' Ludlow ' (votes 19 for). A refined white giant Leedsii variety (Division 4a) with flowers 4⅜ inches in diameter, well poised on 16-inch stems. Raised by Mr. A. M. Wilson and shown by Mr. J. L. Richardson.

To *Narcissus* ' Trousseau ' (votes unanimous). A handsome bicolor Trumpet variety (Division 1c) with large, shapely flowers, 4¾ inches in diameter, well poised on stout 22-inch stems. Raised by the late P. D. Williams and shown by Mr. J. L. Richardson.

Daffodils Selected for Trial.

The following daffodils were selected for trial at Kirton as varieties for garden decoration and for cutting from the open for market :

' Minister Colijn,' shown by Messrs. Farrow, Holbeach St. Marks.

' Little Fortune,' shown by A. W. Bull, Esq., Kimbolton, Hunts.

Daffodil to be seen again.

The Committee expressed a desire to see again, when more blooms are available, an unnamed seedling Daffodil exhibited by Mr. D. McInnes, The Gardens, Glamis Castle, Angus.

Other Exhibits.

Messrs. Kelway, Langport : Daffodils.

Miss E. G. Hebblethwaite, Havenhurst, Malvern : *Narcissus* ' Trinity.'

C. F. Coleman, Esq., Broomhill, Cranbrook : wild forms of *Narcissus Pseudo-Narcissus.*

Mr. J. L. Richardson : *Narcissus* ' Royal Ransom ' and *N.* ' Krakatoa.'

Major C. B. Habershon, Hesterworth, Aston-on-Clun : *Narcissus* ' Borderer.'

Mrs. Barchard, Horsted Place, Uckfield : *Narcissus* ' Francis Barchard.'

Mr. Guy L. Wilson : *Narcissus* ' Hebron.'

APRIL 18, 1939.

The First Masters Memorial Lecture was given by Dr. J. C. WILLIS, F.R.S., on " How Plants have found their Homes." (P. 259.)

Chairman, Sir DANIEL HALL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Fritillaria imperialis Edouardii. Mrs. Tracy sent from a garden near Wimborne flowers of a form of *Fritillaria imperialis* with the stamens much exserted. They were bronze and proved to belong to a form common in Persia which has been named var. *Edouardii.*

Fossil from the coal-measures. The fossil from the coal-measures shown at the last meeting was commented upon by Prof. Sir A. C. Seward, F.R.S., who wrote : " The specimens are pieces of a frond of *Neuropteris,* possibly *N. heterophylla,* though I am not at all sure of the species. *Neuropteris* was always regarded as a fern until about 40 years ago, when it was recognized as a Pteridosperm along with some other fern-like fossils from the coal-measures. *Neuropteris* bore seeds and pollen-sacs ; it was a Gymnosperm. Pteridosperms seem to have been a dominant group in the forests in the coal age and lingered on into the early Mesozoic era, when they became extinct, but exactly at what period one cannot say. No *Neuropteris* fronds have been found bearing sporangia like those of ferns on the under side of the frond. I have given a semi-popular account of Pteridosperms in Plant Life through the Ages."

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. Bunyard, F.L.S., in the Chair, and eleven other members present.

The business occupying the Committee was a discussion on the various kinds of Kales and Beans.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
To Messrs. Blackmore & Langdon, Bath, for Schizanthus.
To Mr. G. H. Dalrymple, Bartley, for Auriculas and Primulas.
To Mr. J. Douglas, Great Bookham, for Auriculas.
To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies and Gerberas.

Flora Medal.

To Draycott Flower Farm, Mickleton, for Primroses, Polyanthus and shrubs.
To Messrs. Kelway, Langport, for tree Paeonies.

Banksian Medal.

To Mr. A. Corderoy, Eltham, for Polyanthus and other hardy plants.
To Dean Gardens, Longniddry, for Primroses and Polyanthus.
To Mr. F. Everitt, Enfield Lock, for Hippeastrums and Clivias.
To Messrs. Low, Enfield, for Carnations.
To Messrs. Napier, Taunton, for Carnations.
To Messrs. Toogood, Southampton, for *Primula obconica.*

Award of Merit.

To *Hippeastrum* ' E. Humphris ' as a greenhouse plant (votes unanimous), from R. F. W. Cartwright, Esq. (gr. Mr. E. Humphris), Aynho Park, Banbury. See p. 286.

Selected for trial at Wisley.

Viola ' Blue Carpet,' from Mr. A. R. Block, Golden Valley Nurseries, Brimscombe.

Award Recommended after trial at Wisley.

Award of Merit.

To Schizanthus ' Cherry Shades,' from Messrs. Carters Tested Seeds, Raynes Park. See p. 289.

Other Exhibits.

Ardwell Nurseries, Beaconsfield : Stocks, Schizanthus and Gerberas.
Lady Kendall-Butler, Shrivenham : Hippeastrums.
Mr. H. G. Longford, Marcham : Polyanthus.
Mrs. C. E. Lowe, Stafford : Polyanthus ' Sugnall.'
T. C. Mansfield, Esq., Glastonbury : *Primula* ' Bedivere.'
D. L. Miln, Esq., Chester : *Primula* ' Deva.'
Northover Nurseries, Glastonbury : *Geranium* ' George Lansbury.'
Messrs. Prichard, Christchurch : *Auricula* ' Furzey.'
Tattlebury Gardens, Goudhurst : Aubrietias.
P. Murray Thomson, Esq., Kingennie : Double Primrose No. 100.
Messrs. Toogood, Southampton : Polyanthus.
Mr. F. L. White, Polegate : hardy plants.

FLORAL COMMITTEE B.—Mr. C. T. Musgrave, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Russell, Windlesham, for Prunus, Wistaria and other flowering shrubs.

Silver Flora Medal.

To Messrs. Hillier, Winchester, for Cherries, Magnolias and other flowering shrubs.

Silver Banksian Medal.

To Messrs. Stuart Low, Enfield, for Camellias and other flowering shrubs.
To Messrs. Notcutt, Woodbridge, for Lilacs and other flowering shrubs.

Flora Medal.

To Messrs. Cheal, Crawley, for Cherries and other flowering shrubs.
To Messrs. Elliott, Stevenage, for Primulas and other rock garden plants.
To Mr. E. Ladhams, Elstead, for rock garden plants and shrubs.

Banksian Medal.

To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.
To Brookside Nurseries, Oxford, for rock garden plants.
To Hocker Edge Gardens, Cranbrook, for Tulips, Fritillarias and other bulbous plants.
To Messrs. Jackman, Woking, for Rhododendrons and other flowering shrubs.
To Knap Hill Nursery, Woking, for Rhododendrons.
To Messrs. Mackenzie, Ilkley, for Primulas and other rock garden plants.
To Marsden Nursery, Ashtead, for rock garden plants.
To Messrs. Prichard, Christchurch, for rock garden plants.
To Messrs. Reuthe, Keston, for flowering shrubs.
To Messrs. Rogers, Southampton, for rock garden plants.
To Messrs. Waterer, Twyford, for rock garden plants.
To Mr. G. E. Welch, Cambridge, for rock garden plants.

Cultural Commendation.

To Mr. E. Humphris, gardener to R. F. W. Cartwright, Esq., Banbury, for a large plant of *Mammillaria elongata.*

Other Exhibits.

Messrs. Burkwood & Skipwith, Kingston : flowering shrubs.
Messrs. Cheal, Crawley : rock garden plants.
Chez Nous Nurseries, Newick : rock garden plants.
Mr. K. W. Harle, Lower Basildon : succulents.
Mrs. Hopkinson, Coulsdon : rock garden plants.
Collingwood Ingram, Esq., Benenden : *Prunus serrulata* 'Taoyama.'
Mr. J. Klinkert, Richmond : clipped trees.
Messrs. Laxton, Bedford : *Pyrus Malus* 'Laxton's Red.'
Lady Martineau, Wentworth : *Prunus nana.*
Messrs. Maxwell & Beale, Broadstone : rock garden plants.
Merivale Nurseries, Sandon : rock garden plants.
Orchard Neville Nurseries, Baltonsborough : rock garden plants.
Messrs. Redgrove & Patrick, Sevenoaks : rock garden plants.
L. de Rothschild, Esq., Exbury : *Acacia longifolia, Pelargonium ardens.*
Messrs. Russell, Windlesham : *Prunus Persica foliis rubris.*
Messrs. Southgate, New Malden : succulents.
A. Langley Smith, Esq., Catford : *Pelargonium quercifolium major.*
Exors. of the late Viscountess St. Cyres, Lymington : *Lachenalia glaucina.*
Mr. G. G. Whitelegg, Chislehurst : Lilac 'Sensation.'

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Charlesworth, Haywards Heath, for a group of Odontoglossums.

Silver Banksian Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group of Orchids.

Award of Merit.

To *Cymbidium* × 'Swift' var. 'Delight' (*Alexanderi* × 'Godwit') (votes 11 for, 2 against), from Sir William Cooke, Bart., Hampstead Norris, Newbury. See p. 286.

Cultural Commendation.

To Mr. W. Pierce, Orchid grower to Col. Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath, for *Maxillaria lepidota,* with about 70 flowers.

To Mr. B. F. Perfect, Orchid grower to Sir Jeremiah Colman, Bart., Gatton Park, Reigate, for *Masdevallia* × *Kimballiana,* with about 40 flowers.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended:—

Gold Medal.

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

Silver-gilt Flora Medal.

To Messrs. The Trenoweth Valley Flower Farm, Ltd., St. Keverne, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. Barr, 11 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

Silver Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for an exhibit of Daffodils.

To Messrs. D. Stewart, Ferndown, Dorset, for an exhibit of Daffodils and Tulips.

Banksian Medal.

To A. L Mera, Esq., Anthos, Vicarage Hill, South Benfleet, for an exhibit of Daffodils.

Daffodil to be seen again.

The Committee expressed a desire to see again *Narcissus* 'Sandringham,' exhibited by Messrs. R. H. Bath.

Other Exhibits.

Daffodils, exhibited by the Bronwylfa Bulb and Fruit Farm, Abergele.

Daffodils and Tulips, exhibited by Messrs. Kelway, Langport.

JOINT RHODODENDRON COMMITTEE.—Lord Strathcona and Mount Royal in the Chair, and nine other members present.

Awards Recommended :—

First-class Certificate.

To *Rhododendron microleucum* (votes 6 for, 2 against), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 289.

Award of Merit.

To *R.* × 'Gaul' (*R. Elliottii* × *R.* × *Shilsonii*) (votes 6 for, 1 against), from Lionel de Rothschild, Esq. See p. 289.

To *R.* × 'Eurydice' (*R. arboreum album* × *R.* × *Loderi*) (votes unanimous), from Lionel de Rothschild, Esq. See p. 288.

To *R.* × 'Little Bert' (*R. euchaites* × *R. repens* ♀) (votes unanimous), from C. R. Scrase-Dickins, Esq., Coolhurst, Horsham, Sussex. See p. 289.

To *R.* × 'White Wings' (*R. bullatum* × *R. ciliicalyx*) (votes unanimous), from C. R. Scrase-Dickins, Esq. See p. 289.

Other Exhibits.

Lionel de Rothschild, Esq.: *R.* × 'Asteroid' (*R.* × 'Dr. Stocker' × *R. Thomsonii*); *R.* hybrid (*R.* × *Loderi* × *R. Thomsonii*); and an unnamed species, F. 21874, *R. probum* aff.

Collingwood Ingram, Esq., Benenden, Kent: *R.* × 'Merops' (*R.* × 'Cunningham's Sulphur' × *R. lacteum*); and *R. Morii.*

JOINT ROCK GARDEN PLANT COMMITTEE.—Mr. F. C. Stern, F.L.S., in the Chair, and nine other members present.

Awards Recommended :—

Preliminary Commendation.

To *Primula umbratilis* as a flowering plant for the alpine house (votes unanimous), from J. T. Renton, Esq., Branklyn, Perth.

Other Exhibits.

F. Barker, Esq., Stevenage, Herts: *Primula pubescens* 'G. H. Berry.'

A. Hansen, Esq., New Barnet: *Sempervivum tectorum* × 'Climax.'

Messrs. M. Prichard, Christchurch: *Lithospermum oleifolium* (A.M. 1938).

Tattlebury Gardens, Goudhurst: *Aubrietia* 'Cascade,' *A.* 'Mauve Dream,' *A.* 'Tattlebury Pink.'

JOINT IRIS COMMITTEE.—Mr. F. C. STERN, F.L.S., in the Chair, and five other members present.

Exhibits.

The Orpington Nurseries, Orpington, Kent: *Iris pumila* var. *attica* and *Iris pumila*, purple flowered form.

APRIL 19, 1939.

The Second Masters Memorial Lecture was given by Dr. J. C. WILLIS, F.R.S., on "How Plants have found their Homes."

Chairman, Professor F. E. WEISS, D.Sc., LL.D., F.R.S., F.L.S.

APRIL 20, 1939.

AT BIRMINGHAM.

JOINT NARCISSUS COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and fourteen other members present.

The Chairman expressed the pleasure which it gave him to preside at the inaugural meeting, as he felt sure that it was in the interest of the Daffodil to have a Joint Committee of the Royal Horticultural Society and the Midland Daffodil Society recommending awards in the name of the two Societies, instead of having the two Societies working independently.

Awards Recommended :—

First Class Certificate.

To *Narcissus* 'Cantatrice,' as a variety for exhibition (votes unanimous). Raised and shown by Mr. Guy L. Wilson, Broughshane, Co. Antrim. See p. 287.

To *Narcissus* 'Slemish,' as a variety for exhibition (votes unanimous). Raised by Mr. Guy L. Wilson and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. 288.

Award of Merit.

To *Narcissus* 'Justice,' as a variety for exhibition (votes unanimous). Raised and shown by Mr. Guy L. Wilson.

To *Narcissus* 'Blarney,' as a variety for exhibition (votes unanimous). Raised and shown by Mr. J. L. Richardson. See p. 287.

Preliminary Commendation.

To *Narcissus* 'Broughshane' (votes unanimous). A remarkably large white Trumpet variety (Division 1b) with a flower 5½ inches in diameter. Raised and shown by Mr. Guy L. Wilson.

To *Narcissus* 'Bahram' (votes unanimous). A well-proportioned Incomparabilis variety (Division 2a) with a flower 4½ inches in diameter. Perianth sulphur-yellow, corona marigold-orange. Raised by Mr. J. L. Richardson and shown by Major C. B. Habershon, Hesterworth, Aston-on-Clun, Salop.

Other Exhibits.

Mr. Guy L. Wilson : *Narcissus* 'Stoke.'

Mr. J. L. Richardson : *Narcissus* 'Curraghmore.'

APRIL 25, 1939.

ALPINE GARDEN SOCIETY'S SHOW.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :—

Award of Merit.

To *Gaultheria sinensis* (K.W. 8562) as a hardy flowering plant for the rock garden (votes unanimous), from Mr. W. J. Marchant, Stapehill, Wimborne.

To *Phyllodoce aleutica* as a hardy flowering plant for the rock garden (votes 8 for, 2 against), from Mr. W. J. Marchant.

To *Silene Wherryi* as a hardy flowering plant for the rock garden or alpine house (votes unanimous), from Messrs. Chez Nous Nurseries, Newick, Sussex

Preliminary Commendation.

To *Epimedium* × *rubrum* as a hardy flowering plant for the rock garden (votes 10 for), from Mrs. A. S. Griffith, Newnham, Cambridge.

To *Iberis Tenoreana* as a hardy plant for the rock garden (votes unanimous), from Lady Lawrence, Riverdale, Dorking.

To *Linum iberidifolium* as a hardy flowering plant for the rock garden or alpine house (votes unanimous), from Dr. P. L. Giuseppi, Trevose, Felixstowe.

To *Pinguicila hirtaeflora* as a hardy flowering plant for the alpine house (votes 10 for, 1 against), from Dr. P. L. Giuseppi.

Cultural Commendation.

To G. P. Baker, Esq., Hillside, Sevenoaks, for *Phyllodoce nipponica* (**A.M.** 1938).

To Dr. A. Q. Wells, Shipton Manor, Kidlington, for *Geum reptans*.

Other Exhibits.

N. G. Baguley, Esq., Garrard Road, Banstead: *Primula* 'Simon' (*P. hirsuta* × *P. pubescens* var. 'Rufus').

G. P. Baker, Esq., Hillside, Sevenoaks: *Fritillaria Olivieri*.

E. Ballard, Esq., The Court, Colwall, nr. Malvern: *Rosmarinus officinalis angustissimus*.

F. Barker, Esq., Onosma, Stevenage: *Primula* 'Xenobia,' *Soldanella villosa*.

Miss C. Beck, Great Amwell, Ware: *Fritillaria messanensis*.

Dr. R. Bevan, Crowsley Grange, Henley-on-Thames: *Ptilotrichum purpureum*.

R. B. Cooke, Esq., Kilbryde, Corbridge: *Meconopsis Sherriffii* (G.S. 2723B.).

P. A. Ferns, Esq., Wilmslow: *Lewisia Eastwoodiana*.

S. H. Gillett, Esq., Sampford Brett, nr. Taunton: *Erysimum pulchellum*.

Dr. P. L. Giuseppi, Trevose, Felixstowe: *Passerina nivea*.

Lt.-Col. C. H. Grey, Hocker Edge Gardens, Cranbrook: *Lupinus ornatus*, *Phlox rigida*, *Ranunculus asiaticus*, orange form (**A.M.** 1935), *Viola pedata bicolor*.

Mrs. A. S Griffith: *Narcissus juncifolius*.

Messrs. W. E. Th. Ingwersen, East Grinstead: *Fritillaria messanensis*.

Mr. W. J. Marchant: *Ledum glandulosum*, *Prunus glandulosa albo-plena*, *Rhododendron imperator* (**A.M.** 1934).

Mrs. J. D. North, Eversley House, Bridgnorth, Salop: *Draba saxemontana*.

Miss E. M. Savory, Emberton House, Olney, Bucks: *Dianthus glacialis*, *Townsendia grandiflora*.

BOOKS AND PAMPHLETS ADDED TO THE LIBRARY IN THE YEAR ENDING DECEMBER 31, 1938.

(*Cont. from p.* lxviii.)

Gorter, David de. Flora Belgica, exhibens plantas per foederatum Belgium crescentes. 8vo. Utrecht, 1767. (4)

Gough, Philip. Illus. *See* STUART, M. Gardener's nightcap.

Gray, Ada. Botanical text-book. 6th ed. Vol. 1. Structural botany. Illus. 8vo. 1887. (C)

Green, Mary Letitia (*Mrs.* T. A. Sprague). *Ed.* *See* LINNAEUS, C. The Critica botanica.

Grossheim, Alexander Alfonsovitch. Analiz florui Kavkaza. Analysis of the flora of the Caucasus. (Akad. Nauk SSSR. Azerbaidzh. Filial, Trud. Bot. Inst., i.) Illus. 8vo. Baku, 1936. (12)

Gunther, Robert William Theodore. *Ed.* Further correspondence of John Ray. *See* RAY SOCIETY. Publications. 1928.

—— *See* HOOKE, R. Micrographia. [Fascimile reprint. 1938].

Hadfield, Miles. Everyman's wild flowers and trees . . . described and illustrated. Col. pls. Illus. 8vo. (1938). (4)

Haines, H. H. [The recent trend of New Forest legislation.] 12mo. n.p. [?1929].

Hall, Patrick, M. The Irish marsh orchids. (Rept. Bot. Exch. Club, xi.) Illus. 8vo. Arbroath, 1937. (2)

Hamer, A. Handel. Wild flowers of the Cape; a floral year. Illus. by ETHEL DRISCOLL & DOROTHY LEVYNS. Col. pls. Illus. 8vo. Cape Town, Oxford & London, [1926]. (C)

Hamilton, Joshua. *Ed.* *See* CULPEPER, N. Culpeper's English family herbal. 1792.

Hanbury, *Sir* Cecil. Garden of. *See* HANBURY, E. D. C. La Mortola garden.

Hanbury, Dorothy. *See* HANBURY, E. D. C.

Hanbury, Effield Dorothy Cecil, *Lady*, & others. La Mortola garden, Hortus Mortolensis, being an illustrated catalogue of the plants cultivated in the garden of *Sir* CECIL HANBURY . . . at La Mortola, Ventimiglia, Italy, compiled with the assistance of ERCOLI MARIO and LORENZI MAURIZIO. 4to. Col. pl. Illus. Oxford & London, 1938. (4)

Harnett, Joseph. *See* BEWLEY, W. F. The cultivation of mushrooms.

Hastain, Eugène. *Illus.* *See* ARKELL, R. More green fingers.

Hatton, R. Marion. *See* MCFARLAND, J. H. & OTHERS. Garden bulbs.

Hay, Thomas. Plants for the connoisseur. Col. pl. Illus. 8vo. (1938). (4)

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(*To be continued.*)

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

MAY 2-3, 1939.

TREE AND SHRUB COMPETITION FOR AMATEURS.

CLASS A.—8 varieties of trees and/or shrubs.

First Prize, £4 : To Rt. Hon. Lord Swaythling, Southampton. (Gr. Mr. F. J. Rose.)
Second Prize, £2 : To Sir Henry Price, Ardingly. (Gr. Mr. J. S. Coates.)
Third Prize, £1 : To The Lord Aberconway, Bodnant. (Gr. Mr. F. C. Puddle.)

CLASS B.—4 varieties of trees and/or shrubs.

First Prize, £3 : To Lord Digby, Minterne, Dorset. (Gr. Mr. A. G. Smith.)
Third Prize, £1 : To Capt. H. G. Hawker, Ermington, S. Devon.

CLASS C.—1 Tree or shrub.

First Prize, £1 : To Admiral A. Walker-Heneage-Vivian, Blackpill.
Second Prize, 15*s.* : To Capt. H. G. Hawker, Ermington.
Third Prize, 10*s.* : To Sir Henry Price, Ardingly. (Gr. Mr. J. S. Coates.)

CLASS D.—1 vase, pot or tub of a tree or shrub, not introduced before 1920.

First Prize, £1 : To Rt. Hon. Lord Swaythling, Southampton. (Gr. Mr. F. J. Rose), who showed *Dipelta yunnanensis*.

SEWELL MEDAL COMPETITION.

Amateurs' Medal.

To Mark Fenwick, Esq., V.M.H., Abbotswood, Stow-on-the-Wold. (Gr. Mr. F. Tustin.)

Trade Growers' Medal.

To Messrs. The Brookside Nurseries, Ltd., Headington.

A Lecture was given by Mr. H. C. GREEN on "Town Window-Box Gardening." Chairman, Mr. J. COUTTS, M.B.E., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Virus-infected Fritillaria. Dr. Tincker showed on behalf of Mr. D. E. Green a virus-infected *Fritillaria Meleagris* showing some floral malformation. He also showed a *Fasciated Tulip* with a double perianth and with double the number of stamens, some of which were petaloid.

Double Narcissus. Mr. Chittenden showed a double Daffodil with two whorls of six perianth pieces and a single corona, the first corona being reduced to small and very narrow strap-shaped pieces between the two perianths. Only three stamens were represented and these by staminodes.

Fasciated Daffodil. Mr. Dalrymple sent a fasciated Daffodil in which the ovaries were also involved.

Gymnosporangium sp. Mr. Chittenden showed a branch of *Juniperus communis* with a copious amount of the gelatinous fructification of a species of Gymnosporangium which has its later stage on Hawthorn or Pear.

Rhododendron × 'Helen Vandevere.' A Rhododendron hybrid, *R. Griersonianum* × *R. occidentale* sent from San Francisco was referred from the Rhododendron Committee. It was sent as a living plant by Mr. Vandevere. The Committee unanimously recommended a Botanical Certificate, this being the first Azaleodendron with these two species as parents.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. Bunyard, F.L.S., in the Chair, and nine other members present.

Exhibits.

Mr. E. A. Bunyard, Allington, Maidstone: Apple 'Golden Delicious' Cherry 'Long Sweet Cutting.'

Messrs. Cannell and Sons, Loddon, Norfolk: Broccoli 'Cockscomb.'

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Napsbury Hospital (gr. Mr. W. J. Jennings), St. Albans, for *Primula obconica.*

Silver Flora Medal.

To Mr. F. J. Bell, Whitley Bay, for Violas.
To Mr. J. Douglas, Great Bookham, for Auriculas.
To Messrs. Engelmann, Saffron Walden, for Gerberas, Carnations and Pansies.
To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Banksian Medal.

To Mr. F. Everitt, Enfield Lock, for Hippeastrums.
To Messrs. Kelway, Langport, for Tree Pæonies.
To Mrs. Montefiore (gr. Mr. R. J. Barnard), Culworth, for Scented Pelargoniums.
To Messrs. Napier, Taunton, for Carnations.
To Messrs. Simmons, Finchley, for Violas.

Cultural Commendation.

To Mr. E. Humphris (gardener to R. F. W. Cartwright, Esq.), Aynho Park, Banbury, for Calceolaria 'Victoria Prize Strain.'

Other Exhibits.

F. Lansdell, Esq., Saltdean: Cheiranthus 'Frances Kermode.'
Messrs. Laxton, Bedford: Rose 'The Doctor' (to be seen again).
G. Murray, Esq., Staplehurst: Double Pansy.
Tattlebury Gardens, Goudhurst: Aubrietias.
Messrs. Wall, Bath: Aquilegias.
Mr. Graham Watson, Saffron Walden: Schizanthus.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and sixteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Messrs. Jackman, Woking, for Rhododendrons and other flowering shrubs.

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for Azaleas, Cherries and other flowering shrubs.
To Mr. E. Ladhams, Elstead, for rock-garden plants.

Flora Medal.

To Messrs. Waterer, Twyford, for Azaleas and rock-garden plants.

Banksian Medal

To Messrs. Bedford & Page, Cambridge, for rock-garden plants.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Hocker Edge Gardens, Cranbrook, for Tulips and other bulbous plants.
To Messrs. Prichard, Christchurch, for rock-garden plants.
To Messrs. Redgrove & Patrick, Sevenoaks, for shrubs and rock-garden plants.

Lindley Medal.

To Lieut.-Col. W. R. Pinwell, for a fine exhibit of *Magnolia Campbellii.*

Award of Merit.

To *Berberis valdiviana* as a hardy flowering shrub (votes unanimous), from Lady Lawrence, Dorking. See p. 330.

To *Pyrus Malus* 'Laxton's Red' as a hardy flowering tree (votes unanimous), from Messrs. Laxton Bros. Bedford Ltd., Bedford. See p. 332.

Other Exhibits.

G. P. Baker, Esq., Sevenoaks : *Fritillaria glauco-viridis, F. Meleagris forma.*
Mr. A. Corderoy, Eltham : rock-garden plants.
Four Oaks Nursery, Uckfield : rock-garden plants.
Mrs. K. Hopkinson, Coulsdon : rock-garden plants.
Lady Lawrence, Dorking : *Damnacanthus indicus, Exochorda Alberti pendula.*
Orchard Neville Nurseries, Baltonsborough : rock-garden plants.
Messrs. Prichard, Christchurch : *Erica australis* ' Riverslea.'
Mr. G. G. Whitelegg, Chislehurst : Lilac ' Sensation.'
Widbrook Nurseries, Cookham : rock-garden plants.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., V.M.H., in the Chair, and ten other members present.

Award Recommended :—

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group of Orchids.

There were no other exhibits on this occasion.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Barr, 11 King Street, Covent Garden, W.C. 2, for an exhibit of Tulips.

Silver Flora Medal.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for an exhibit of Tulips.

To Messrs. D. Stewart, Ferndown, Wimborne, for an exhibit of Tulips and Daffodils.

Banksian Medal.

To Messrs. Kelway, Langport, for an exhibit of Tulips and Daffodils.

Award of Merit.

To *Narcissus* ' Samite ' as a variety for exhibition (votes unanimous), from Mr. G. L. Wilson. See p. 331.

Preliminary Commendation.

To Tulip ' Jason ' as a variety for garden decoration (votes unanimous). A Cottage Tulip (Division 6) with flowers about 3½ inches long and of a rich aureolin yellow, borne on 18-inch stems. Raised by the late Mr. W. T. Ware and shown by Messrs. Barr.

Other Exhibits.

Daffodils and Tulips, shown by Messrs. Wakeley, Bankside, S.E. 1.
Tulip ' Countess,' shown by Messrs. Barr.

Awards after trial at Wisley.

First-class Certificate.

To *Narcissus* ' Carlton,' sent by Mr. J. L. Richardson, Prospect House, Waterford.

To *Narcissus* ' Warlock,' sent by A. M. Wilson, Esq., Middlemoor, Presteign, Radnorshire.

To *Narcissus* ' Cheerfulness,' sent by Messrs. Barr.

Award of Merit.

To *Narcissus* ' Sulphur Prince,' sent by Mr. G. L. Wilson.

To *Narcissus* ' Charles I,' sent by the late Mr. P. D. Williams, Lanarth, St. Keverne, Cornwall.

To *Narcissus* ' Worlington,' sent by Miss K. M. Hinchliff, Worlington House, Instow.

To *Narcissus* ' St. Ives,' sent by the late Mr. P. D. Williams.

To *Narcissus* ' Snow Queen,' sent by Messrs. R. A. Vanderschoot, Ltd , Hillegom, Holland.

To *Narcissus* ' White's Hybrid,' sent by Messrs. de Graaff-Gerharda, Lisse, Holland.

To *Narcissus* ' Floore,' sent by Miss R. Thornton, Brockhall, Northampton.

Highly Commended.

To *Narcissus* ' Golden Ray,' sent by Messrs. de Graaff-Gerharda.

To *Narcissus* ' Mrs. Ernst H. Krelage,' sent by Messrs. de Graaff-Gerharda.

To an *incomparabilis* seedling (Division 2a) grown under trial number 282, subject to naming, sent by Mr. H. A. Brown, Lyndale, Glenfern Road, Fern Tree Gully, Victoria, Australia.

To *Narcissus* 'Girdle,' sent by Mr. W. A. Watts, The Welsh Bulb Fields, St. Asaph.

To *Narcissus* 'Caedom,' sent by Messrs. Barr.

Commended.

To *Narcissus* 'Pepper,' sent by the late Mr. P. D. Williams.

JOINT RHODODENDRON COMMITTEE.—Lord ABERCONWAY, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

First-class Certificate.

To *Rhododendron* × 'Blue Diamond' (*R. Augustinii* ♂ × *R.* × 'Intrifast' ♀. (votes 19 for), from J. J. Crosfield, Esq., Embley Park, Romsey, Hants. See p. 332.

Award of Merit.

To *R.* × 'Elisabeth' (*R. Griersonianum* × *R. repens*) (votes unanimous), from Lord Aberconway, Bodnant, N. Wales. See p. 333.

Preliminary Commendation.

To *R.* × 'Helen Vandevere' (*R. Griersonianum* × *R.* (*Azalea*) *occidentale*) (votes unanimous) ; the Committee desired to see this Azaleodendron plant again when more mature, and recommended that it should be sent before the Scientific Committee.

Selected for trial at Wisley.

R. × 'Snow Queen' (*R. decorum* × *R.* × *Halopeanum*) (**A.M.** 1934), from the Knap Hill Nursery, Woking.

R. (*Azalea*) 'Mrs. C. E. Brown' (*R. macrantha* ×), and *R.* (*Azalea*) 'Chas. E. Brown' (*R. Hinodegiri* ×), both sent by Messrs. D. Stewart, Ferndown Nurseries, Wimborne, Dorset.

Other Exhibits.

Capt. Talbot Fletcher, Margam Castle, Port Talbot : *R. desquamatum.*

J. J. Crosfield, Esq. : *R.* × 'Ma Belle' (*R.* × *Griffithii* cross).

Lt.-Col. G. H. Loder, High Beeches, Handcross, Sussex : *R. sphaeroblastum.*

The Rt. Hon. Lord Swaythling, Townhill Park, Southampton : *R.* × 'Cremorne' var. (*R. campylocarpum* × *R.* × *Luscombei*) ; *R.* × 'Gladys' (*R. campylocarpum* × *R. Fortunei*) (**A.M.** 1926) ; and *R. tsangpoense.*

Collingwood Ingram, Esq., Benenden, Kent : *R.* × 'Juliana' (*R. Griersonianum* × *R.* × 'Queen Wilhelmina') ; and *R.* × 'Curig' (*R.* × 'Dr. Stocker' cross).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN, O.B.E., M.C., F.L.S., in the Chair, and nine other members present.

Awards Recommended :—

Award of Merit.

To *Calanthe striata Sieboldii elegantissima* as a flowering plant for the alpine house (votes unanimous), from Lord Aberconway, V.M.H., Bodnant. See p. 330.

Preliminary Commendation.

To *Senecio sp.* as a flowering plant for the rock garden (votes unanimous), from Frank Barker, Esq., Stevenage.

Cultural Commendation.

To Frank Barker, Esq., Stevenage, for a pan of *Androsace hirtella.*

Other Exhibits.

G. P. Baker, Esq., Sevenoaks : *Cotyledon roseum.*

Messrs. Prichard, Christchurch : *Primula.*

Messrs. Roger, Pickering : *Saxifraga muscoides* 'Cloth of Gold.'

JOINT IRIS COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

There was no business before the Committee on this occasion.

MAY 16, 1939.

FRUIT AND VEGETABLE COMMITTEE.—Mr. W. H. DIVERS, V.M.H., in the Chair, and twenty-five other members present.

Exhibit.

Mr. G. S. Dunn, The Hame, Redbourn, Herts : Strawberry 'Redbourn.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-two other members present.

Award Recommended :—

Award of Merit.

To Rose 'The Doctor' (votes unanimous), from Messrs. Laxton Bros., Bedford Ltd., Bedford. See p. 334.

Selected for trial at Wisley.

Auricula 'Blue Charm,' from Messrs. J. R. Pearson, Lowdham, Notts.

Dianthus 'Flandria,' from Messrs. C. Engelmann, Saffron Walden.

Violetta 'Charmer,' 'Harlequin,' 'Lavinia,' 'Neapolitan,' 'Oliver,' 'Peace,' 'Rosina' and 'Sweetness,' from Messrs. Dobbie, Edinburgh.

Other Exhibits.

Messrs. Allwood, Haywards Heath : Dianthus 'Rainbow Loveliness.'
Mr. H. A. Brown, South Chingford : Fuchsia 'Cheerie.'
Messrs. Hurst, Houndsditch : Schizanthus 'Dwarf Bouquet Mixed.'
Messrs. Low, Enfield : Hydrangea 'Mrs. Norman Luff.'
Messrs. Oliver & Hunter, Dumfries : Polyanthus 'Lady Isobel Scott.'
Mr. Jan Spek, Boskoop, Holland : Rose 'Orange Nassau' (**A.M.** 1938).
Messrs. Stark, Fakenham : Polyanthus 'Orange King.'

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and thirty other members present.

Awards Recommended :—

Award of Merit.

To *Adiantum pedatum japonicum* as a hardy fern (votes unanimous), from Messrs. Perry, Enfield. See p. 330.

To *Crinum Laurentii* as a flowering plant for the greenhouse (votes 14 for, 1 against), from Mrs. J. B. Akroyd, Limpsfield. See p. 330.

Other Exhibits.

Lord Aberconway, Bodnant : *Aristotelia racemosa, Lomatia obliqua.*
Messrs. Burkwood & Skipwith, Kingston . *Cytisus* 'Geoffrey Skipwith.'
Misses Cadell, Longniddry : *Meconopsis grandis.*
Messrs. Charlton, Tunbridge Wells : *Viburnum* × *Burcephalum.*
W. Dallimore, Esq., Bidborough : *Cytisus* 'Gillian Nash,' *C.* 'Kathleen M. Dallimore,' *C.* 'Mrs. W. Dallimore,' *C.* 'Edith A. Dallimore.'
Messrs. C. Engelmann, Saffron Walden : *Lilium candidum*, Salonika var.
Messrs. Gibson, Leeming Bar : *Cupressus Fletcheri variegata.*
Collingwood Ingram, Esq., Benenden : *Gladiolus* 'Aurora Borealis,' *Malus baccata* var. *mandschurica.*
Major Johnston, Hidcote Manor : *Mahonia lomariaefolia.*
Messrs. Oliver & Hunter, Moniaive : *Meconopsis quintuplinervia.*
Messrs. Perry, Enfield : *Paeonia Wittmanniana rosea, Adiantum pedatum.*
Messrs. Prichard, Christchurch : *Paeonia* 'Pearl of May,' *Symphytum peregrinum, Anemone* × *Lesseri, Polygonum pseudo-sphaerostachyum.*
The Duke of Richmond and Gordon, Goodwood : *Richardia Pentlandii.*
Executors of the late Viscountess St. Cyres, Lymington : *Distylium racemosum.*
Lionel de Rothschild, Esq., Exbury : *Colletia infausta.*
Miss L. Stone, Gravesend : *Cytisus* seedlings.
Messrs. Watson, Killiney : *Cytisus* 'Killiney Bicolor,' *C.* 'Killiney Red,' *C.* 'Killiney Salmon,' *C.* 'Killiney Bizarre,' *C* 'Killiney Burgundy.'
Mr G. G. Whitelegg, Chislehurst : Lilac 'Sensation.'

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Award of Merit.

To *Lycaste* × 'Lady Colman' var. 'Golden Queen' (*Imschootiana alba* × *Locusta*) (votes unanimous), from Sir Jeremiah Colman, Bart., Gatton Park, Surrey. See p. 331.

To *Cymbidium* × 'Profusion' var. 'Cherioma' ('Ceres' × 'Vesta') (votes 13 for, 3 against), from Messrs. McBean, Cooksbridge. See p. 331.

To *Odontioda* × 'Pierette' (*Odontoglossum* × *Jamesianum* × *Odontioda* × *Joiceyi*) (votes 16 for), from Messrs. McBean. See p. 332.

To *Odontonia* × 'Catana' var. 'The Spinney' (*Odontoglossum* × *eximium* × *Odontonia* × 'Bleuardent') (votes 16 for), from F. E. Griggs, Esq., Chislehurst, Kent. See p. 332.

To *Odontonia* × 'Ida' (*Miltonia* × *Charlesworthii* × *Odontoglossum* × 'Minotaur') (votes 16 for), from F. E. Griggs, Esq. See p. 332.

To *Cymbidium* × 'Dorchester,' Orchidhurst var. (*Alexanderi* × 'Tityus') (votes 17 for, 3 against), from Messrs. Armstrong & Brown, Tunbridge Wells. See p. 331.

To *Miltonia* × 'Limelight' (*Armstrongiae* × 'Lycaena') (votes 12 for, 5 against), from Messrs. Armstrong & Brown. See p. 331.

To *Oncidioda* × 'Stuart Low' (*Oncidioda* × *Cooksoniae* × *Oncidium macranthum*) (votes 19 for), from Messrs. Stuart Low, Jarvis Brook. See p. 332.

To *Odontioda* × 'Marie Antoinette' var. 'Milo' (*Odontioda* × 'Colinge' × *Odontoglossum* × 'President Poincare') (votes unanimous), from Messrs. Charlesworth, Haywards Heath. See p. 332.

To *Odontoglossum* × 'Brimstone Butterfly' var. 'Gold Wings' (*crispum* × *Armstrongiae*), from Messrs. Armstrong & Brown. See p. 332.

To *Brassia* species, allied to *B. longissima* (votes 17 for), from Messrs. Mansell & Hatcher, Rawdon. See p. 330.

Cultural Commendation.

To Mr. B. F. Perfect, Orchid grower to Sir Jeremiah Colman, Bart., Gatton Park, Reigate, for *Sarcochilus Fitzgeraldii albus* with many flowers.

To Messrs. Sanders, St. Albans, for a fine plant of *Aerides virens Sanderae*.

NARCISSUS AND TULIP COMMITTEE.—Mr. F. A. Secrett, F.L.S., V.M.H., in the Chair, and fourteen other members present.

Exhibits.

The only plants submitted to the Committee were two sports from Tulip 'Fantasy,' one called 'Ice Cream' and the other unnamed, shown by the Earl of Darnley, Cobham Hall, Kent.

JOINT RHODODENDRON COMMITTEE.—Lord Strathcona and Mount Royal in the Chair, and seventeen other members present.

Awards Recommended :—

First-class Certificate.

To *Rhododendron* × 'Touchstone' (*R. Griffithianum* hybrid) (votes 13 for, 4 against), from J. J. Crosfield, Esq., Embley Park, Romsey, Hants. See p. 334.

To *R.* × 'Naomi' var. 'Stella Maris' (*R.* × 'Aurora' ♀ × *R. Fortunei* ♂) (votes 12 for), from Lionel de Rothschild, Esq., Exbury House, Exbury, Southampton. See p. 333.

To *R.* × 'David' (*R.* × 'Hugo Koster' ♀ seedling) (votes unanimous), from the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton. See p. 333.

Award of Merit.

To *R.* × 'Zuyder Zee' var. 'Jersey Cream' (*R. campylocarpum* ♀ × *R.* × 'Mrs. Lindsay Smith' ♂) (votes unanimous), from J. J. Crosfield, Esq. See p. 334.

To *R.* × 'Rosefinch' (*R.* × 'Bella' ♀ × *R. Griersonianum* ♂) (votes 11 for, 5 against), from Lord Aberconway, Bodnant, N. Wales. See p. 334.

To *R. Bureavii* (votes 10 for, 4 against), from Lionel de Rothschild, Esq. See p. 332.

To *R. caeruleum* (Rock 59207) (votes 12 for, 3 against), from Lionel de Rothschild, Esq. See p. 333.

To *R.* × 'Goblin' (*R.* × 'Break of Day' × *R. Griersonianum*) (votes 11 for, 4 against), from Lionel de Rothschild, Esq. See p. 333.

To *R.* (*Azalea*) × 'Louise' (*R. Kaempferi* ♀ × *R.* 'Dark Red Indian' ♂) (votes 13 for), from Lionel de Rothschild, Esq. See p. 333.

Other Exhibits.

J. J. Crosfield, Esq.: *R.* × 'Rosy Dawn' (*R. Thomsonii* ♂ × a *R. Fortunei* hybrid ♀); *R.* × 'Coronation Day' (*R.* × *Loderi* ♂ × *R.* × 'Pink Shell' ♀); *R.* × 'Chaste' (*R. campylocarpum* ♀ × *R.* × 'Queen o' the May' ♂).

Messrs. W. C. Slocock, Woking, Surrey: *R. Wallichii.*

C. Williams, Esq., Caerhayes Castle, Gorran, Cornwall: *R.* (*Azalea*) × 'Black Hawk'; *R.* (*Azalea*) × 'Hiawatha'; and four unnamed Azalea seedlings.

Lord Aberconway: *R.* × 'Matador' (*R. Griersonianum* ♂ × *R. strigillosum* ♀); *R.* × 'Edusa' (*R. campylocarpum* ♂ × *R.* × 'Penjerrick' ♀); *R.* × 'Hiraethlyn' (*R. Griffithianum* ♂ × *R. haematodes* ♀); *R.* × 'Winsome' (*R. Griersonianum* ♂ × *R.* × 'Humming Bird' ♀); *R.* × 'Eros' (*R.* × 'Amaura' ♀ × *R. Griersonianum* ♂); *R.* × 'May Day,' Bodnant form (*R. Griersonianum* × *R. haematodes*); and *R.* × 'Calrose' (*R. calophytum* ♀ × *R. Griersonianum* ♂) (to be seen again).

The Marquis of Headfort, Headfort House, Kells, Co. Meath: *R.* × 'Sangreal' (*R. Griersonianum* ♂ × *R. sanguineum* ♀); and *R.* × 'May Day' (**A.M.** 1932).

Lionel de Rothschild, Esq.: *R.* × 'Naomi,' Exbury var.; an unnamed hybrid (*R.* × 'Naomi,' Exbury var. × *R. Wardii*) (to be seen again); *R. habrotrichum* (nearly white form); and true *R. ponticum* (Ball 1561).

Collingwood Ingram, Esq., Benenden, Kent: *R.* × 'Blanc de Chine' (*R.* × *Gauntlettii* ♀ × *R.* × *Loderi* ♂); *R.* × 'Sea Nymph' (*R. chaetomallum* ♀ × *R. dichroanthum* ♂); and another hybrid, *R. croceum* ♂ × *R.* × 'White Pearl' ♀.

The Rt. Hon. Lord Swaythling: *R.* × 'Sulphur Yellow,' Townhill var. (*R. campylocarpum* ♂ × *R. Souliei* ♀).

Col. G. H. Loder, High Beeches, Handcross, Sussex: *R.* × 'Grierocaster' (*R.* × 'Doncaster' ♂ × *R. Griersonianum* ♀).

Mr. W. J. Marchant, Stapehill, Wimborne: *R.* × 'Hampreston' (*R. glaucum* ♀ × *R. russatum* ♂).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. Stern, O.B.E., M.C., F.L.S., in the Chair, and ten other members present.

Awards Recommended :—

Award of Merit.

To *Anemone umbellata* as a flowering plant for the rock garden and alpine house (votes unanimous), from Dr. N. W. Jenkin, Hindhead. See p. 330.

To *Fritillaria Guicciardii* as a flowering plant for the rock garden and alpine house (votes 7 for, 1 against), from G. P. Baker, Esq., V.M.H., Sevenoaks. See p. 331.

To *Helichrysum virgineum* as a flowering plant for the alpine house (votes 6 for, 2 against), from Mrs. Gwendolyn Anley, Woking. See p. 331.

To *Saponaria ocymoides rubra compacta* as a flowering plant for the rock garden and alpine house (votes 8 for), from Mrs. Gwendolyn Anley, Woking, and Orchard Neville Nurseries, Baltonsborough. See p. 334.

Preliminary Commendation.

To *Pinguicula longifolia* as a flowering plant for the rock garden and alpine house (votes unanimous), from Dr. Roger Bevan, Henley-on-Thames.

Other Exhibits.

G. P. Baker, Esq., Sevenoaks: *Fritillaria lanceolata, F. liliacea, F. pyrenaica,*

Lt.-Col. C. H. Grey, Cranbrook: *Nomocharis oxypetala.*

JOINT IRIS COMMITTEE.—Major F. C. Stern, O.B.E., M.C., F.L.S., in the Chair, and ten other members present.

Award Recommended :—

Award of Merit.

To Iris 'Tol-long,' for general garden use (votes 8 for, 1 against), from Mr. Amos Perry, Enfield. See p. 331.

Preliminary Commendation and Selected for trial at Wisley.

To Iris 'Simplex Munditis,' as a hardy flowering plant (votes 8 for, 1 against), from F. Wynn Hellings, Esq., Esher, Surrey.

Other Exhibits.

Mr. A. C. Helps, West Baldon, nr. Sunderland: Irises 'Yocaste' and 'Andromache.'

Major F. C. Stern, Goring-by-Sea: *Iris antilibanotica* (**A.M.** 1936), *I. Westii* (to be seen again).

F. W. Tomalin, Esq., Hampton: Iris 'Silver Moon.'

John Innes Horticultural Institution, Merton: Iris 'William Mohr' (**A.M.** 1930).

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and seven other members present.

Award Recommended :—

Award of Merit.

To Carnation 'Maytime,' as a market variety (votes unanimous), from Messrs. Allwood Bros., Haywards Heath. See p. 330.

Other Exhibits.

Messrs. Allwood Bros., Haywards Heath: Carnations 'Mary Allwood II,' 'Royal Beauty,' 'Sir Harry Brittain,' 'Yellow Pelargonium.'

Sir Henry Tate, Launde Abbey: Carnation 'Nairne.'

Miss Jewell Allcroft, Anibury: Carnation 'Penelope Wright of Stokesay.'

CHELSEA SHOW.

MAY 17, 18 AND 19, 1939.

Held in the Grounds of the Royal Hospital, Chelsea.

LIST OF AWARDS.

The Sherwood Challenge Cup, for the most meritorious exhibit in the Show.

To Messrs. Barr, 11–13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Tulips.

The Cain Challenge Cup, offered for award for the best exhibit shown by an amateur.

To J. Pierpoint Morgan, Esq., LL.D., D.C.L., D.Sc., Wall Hall, Watford, Herts (gr. Mr. F. A. Steward), for an exhibit of stove and greenhouse plants.

Gold Medals.

To Messrs. Bees Ltd., of Chester, for a mixed group of herbaceous and bulbous plants.

Sir Jeremiah Colman, Bt., V.M.H., of Gatton Park, Reigate (Orchid grower, Mr. B. F. Perfect), for Orchids.

To Lionel de Rothschild, Esq., O.B.E., V.M.H., of Exbury, Southampton (Orchid grower, Mr. B. Hills), for Orchids.

To Messrs. Laxton, of Bedford, for Strawberries.

To Messrs. W. A. Constable, of Tunbridge Wells, for Lilies.

To Messrs. Hillier, of Winchester, for shrubs, including Rose species.

To J. Pierpoint Morgan, Esq., LL.D., D.C.L., D.Sc., of Wall Hall, Watford (gr. Mr. F. A. Steward), for stove and greenhouse plants.

To Messrs. R. Wallace, of Tunbridge Wells, for a mixed group of Lilies and other bulbous plants, Rhododendrons and Azaleas.

To Messrs. John Waterer, Sons & Crisp, of Bagshot, Surrey, for Rhododendrons.

To Messrs. Barr, of King Street, W.C. 2, for Tulips.

To Messrs. Dobbie, of Edinburgh, for Tulips.

To Mr. Granville B. Ellis, of Sunningdale, for a rock garden.

To Mr. G. G. Whitelegg, of Chislehurst, for a rock garden.

To Messrs. Wm. Wood, of Taplow, for a rock garden.

To Messrs. Allwood, of Haywards Heath, for Perpetual-flowering Malmaison and Border Carnations, and hybrid Pinks.

To Messrs. Blackmore & Langdon, of Bath, for a mixed group of Begonias, Gloxinias and Delphiniums.

To Messrs. Carters Tested Seeds, of Raynes Park, S.W., for Florists' Flowers.

To Messrs. Alex. Dickson, of Newtownards, N. Ireland, for Roses.

To Messrs. C. Engelmann, of Saffron Walden, for Carnations.

To Messrs. Sutton, of Reading, for annuals.

To Messrs. J. Cheal, of Crawley, for a formal garden.

To Mr. A. J. Simon, of Finchley Road, N.W., for a formal town garden.

To Messrs. John Waterer, Sons & Crisp, of Twyford, for a formal Iris garden.

To Messrs. H. G. Alexander, of Tetbury, for Orchids.

To Messrs. Armstrong & Brown, of Tunbridge Wells, for Orchids.

To Messrs. Charlesworth, of Haywards Heath, for Orchids.

To Messrs. McBean, of Cooksbridge, nr. Lewes, for Orchids.

To Messrs. Sanders, of St. Albans, for Orchids.

Silver Cups.

To Messrs. R. H. Bath, Ltd., of Wisbech, for Tulips.

To Messrs. Fogwills, Ltd., of Guildford, for vegetables.

To Messrs. Bakers, of Codsall, for a mixed group of Delphiniums and Lupins.

To Messrs. Konynenburg & Mark of Noordwyk, Holland, for Gladioli.

To Messrs. Knaphill Nursery Ltd., of Woking, for Azaleas.

To Mr. Amos Perry, of Enfield, for a mixed group of Ferns, herbaceous, bulbous and bog plants.

To Messrs. John Waterer, Sons & Crisp, Ltd., of Bagshot, for trees and shrubs.

To Messrs. Clarence Elliott, Ltd., of Stevenage, for a rock garden.

To Baron Bruno Schröder (gr. Mr. F. A. Bush), of Englefield Green, for Hippeastrum Hybrids.

To Mr. Percy S. Cane, of Cliveden Place, S.W. 1, for a formal garden.

To Messrs. Wm. Cutbush & Son, Ltd., of Barnet, for a Rose garden.

To Mr. R. Hancock, of Sloane Street, S.W. 1, for a formal Mediterranean garden.

To Mr. A. Gavin Jones, of Letchworth, for a formal garden.

To Messrs. Landscape Ltd., of Finchley Road, N.W. 3, for a formal town garden.

To Mr. James MacDonald, of Harpenden, for a formal grass garden.

To Messrs. R. Wallace & Co., Ltd., of Tunbridge Wells, for a formal garden.

To Messrs. Black & Flory, of Slough, for Orchids.

To Messrs. The Stuart Low Co., of Crowborough, for Orchids.

To Messrs. J. Cheal & Sons, of Crawley, for trees and shrubs.

Silver-gilt Flora Medals.

To Messrs. John Waterer, Sons & Crisp, of Twyford, Berks., for herbaceous plants, including Irises.

To Messrs. Hillier, of Winchester, for trees and shrubs.

To Messrs. G. Jackman, of Woking, for a mixed group of Clematises and other shrubs and herbaceous plants.

To The Executors of the late R. C. Notcutt, of Woodbridge, for Lilacs

To Messrs. L. R. Russell, of Windlesham, for trees and shrubs.

To Messrs. L. R. Russell, of Windlesham, for stove and greenhouse plants.

To Mr. G. H. Dalrymple, of Bartley, Southampton, for Primulas and Meconopsis species.

To Messrs. Daniels, of Norwich, for Tulips.

To Messrs. Wakeley, of Bankside, S.E., for Tulips.

To Messrs. Hillier, of Winchester, for an informal garden.

To Messrs. Ryder, of St. Albans, for a formal garden.

To Mr. Ian G. Walker, of South Godstone, for a formal garden.

To Messrs. Mansell & Hatcher, of Rawdon, for Orchids.

To Messrs. Ben. R. Cant, of The Old Rose Gardens, Colchester, for Roses.

Silver-gilt Banksian Medals.

To Messrs. Orpington Nurseries, of Orpington, for Irises.

To Messrs. Wm. Wood, of Taplow, for herbaceous plants.

To Messrs. Baggesen's Nurseries, of Pembury, for Rhododendrons and other trees and shrubs.

To Messrs. A. Charlton, of Rotherfield, for Rhododendrons and other shrubs.

To Messrs. Hollamby's Nurseries, of Groombridge, for Rhododendrons, Azaleas and Japanese Maples.

To Messrs. L. R. Russell, of Windlesham, for Azaleas.

To Mr. G. G. Whitelegg, of Chislehurst, for Azaleas.

To Messrs. J. R. Pearson, of Lowdham, for Tulips.

To Messrs. Bedford & Page, of Trumpington, Cambridge, for a rock garden.

To Messrs. Pulham, of Newman Street, W. 1, for a rock garden.

To Messrs. Frank Cant, of Braiswick Rose Gardens, Colchester, for Roses.

To Mr. James Douglas, of Great Bookham, for Border Carnations.

To Messrs. C. Engelmann, of Saffron Walden, for a mixed group of Zinnias, Gerberas and Lilies.

To Messrs. The Stuart Low Co., of Enfield, for Carnations.

To Messrs. E. Webb, of Stourbridge, for flowering plants from seeds.

To Messrs. Harry Dixon, of Wandsworth Common, S.W. 18, for Orchids.

Silver Flora Medals.

To Messrs. Barr, of King Street, W.C. 2, for herbaceous plants, including Irises.

To Messrs. G. Bunyard, of Maidstone, for a group of Irises.

To Messrs. Dobbie, of Edinburgh, for Dahlias.

To Messrs. Dobbie, of Edinburgh, for Violas.

To Messrs. Robert Green, of Crawford Street, W. 1, for bedding plants.

To Messrs. J. C. Allgrove, of Langley, Slough, for a mixed group of shrubs, herbaceous plants and Rose species.

To Messrs. Burkwood & Skipwith, of Kingston-on-Thames, for shrubs and trees.

To Messrs. The Donard Nursery Co., of Newcastle, Co. Down, for shrubs.

To Messrs. R. Gill, of Penryn, Cornwall, for Rhododendrons.

To Messrs. The Stuart Low Co., of Enfield, for a mixed group of greenhouse shrubs and Hippeastrum Hybrids.

To Mr. W. J. Marchant, of Stapehill, Wimborne, for trees and shrubs.

To The Executors of the late R. C. Notcutt, of Woodbridge, for shrubs.

To Messrs. John Peed, of West Norwood, S.E., for *Richardia Pentlandii* and other stove and greenhouse plants.

To Messrs. G. Reuthe, of Keston, for shrubs, including Rhododendrons.

To Messrs. W. C. Slocock, of Woking, for Rhododendrons.

To Messrs. R. Veitch, of Alphington, nr. Exeter, for trees and shrubs.

To Messrs. A. Dawkins, of Chelsea, for Tulips.

To The Rev. Canon H. Rollo Meyer, of Berkhamsted (gr. Mr. J. P. Izzard), for Tulips.

To Messrs. M. Prichard, of Christchurch, for rock-garden plants.

To Messrs. The Hocker Edge Gardens, of Cranbrook, for a rock garden.

To Messrs. W. E. Th. Ingwersen, of East Grinstead, for a rock garden.

To Messrs. Ashington Nurseries, of Ashington, for Carnations.

To Messrs. Robert Bolton, of Halstead, for Sweet Peas.

To Messrs. Dobbie, of Edinburgh, for Antirrhinums.

To Messrs. C. Gregory, of Chilwell, Nottingham, for Roses.

To Mr. Elisha J. Hicks, of Hurst, Reading, for Roses.

To Messrs. Kelway, of Langport, for Paeonies.

To Messrs. Hewitt, of Stratford-on-Avon, for a mixed group of Thalictrums, Delphiniums, Lupins and Verbascums.

To Mr. Ernest Ladhams, of Godalming, for a mixed group of herbaceous and aquatic plants, and shrubs.

To Mr. Stuart Ogg, of Swanley, for Dahlias.

To Messrs. M. Prichard, of Christchurch, for herbaceous plants.

To Messrs. C. S. & A. J. W. Browning of Cheam, for Orchids.

To F. E. Griggs, Esq., of Chislehurst (gr. Mr. R. J. Cox), for Orchids.

Silver Banksian Medals.

To Messrs. Kelway, of Langport, for a miscellaneous group of Tulips and Ranunculuses.

To Messrs. H. Prins, of Wisbech, for Tulips.

To Messrs. D. Stewart, of Ferndown Nurseries, nr. Wimborne, for Tulips.

To Messrs. Brookside Nurseries, of Headington, for rock-garden plants.

To Messrs. Dartington Hall, of Totnes, for Primulas, Meconopsis, and other rock-garden plants.

To Messrs. W. E. Th. Ingwersen, of East Grinstead, for rock-garden plants.

To Messrs. John Waterer, Sons & Crisp, of Twyford, for rock-garden plants.

To Mr. G. E. Welch, of Cambridge, for rock-garden plants.

To Mr. F. J. Bell, of Whitley Bay, for Pansies and Violas.

To Messrs. Carter Page, of London Wall, E.C. 2, for Dahlias.

To Messrs. Clark, of Dover, for a mixed group of herbaceous and bulbous plants.

To Messrs. Redgrove & Patrick, of Seal, Sevenoaks, for herbaceous plants.

To Messrs. Suffolk Seed Stores, of Woodbridge, for herbaceous plants.

To Messrs. S. Bide, of Farnham, for trees and shrubs.

To Messrs. Robert Green, of Crawford Street, W. 1, for Bay trees.

To Messrs. W. G. Haskins, of Bournemouth West, for Clematises and other shrubs.

To Mr. John Klinkert, of Richmond, Surrey, for Clipped Box, Bay and Yew trees.

To Messrs. Knaphill Nursery, of Woking, for dwarf Conifers.

To Messrs. W. T. Neale, of Worthing, for a mixed group of Cacti, succulents and Gazanias.

To Messrs. Pennell, of Lincoln, for a mixed group of Clematises and Statices.

To Messrs. John Scott, of Merriott, for shrubs.

To Messrs. D. Stewart, Ferndown Nurseries, nr. Wimborne, for a mixed group of Azaleas, Rhododendrons and other shrubs.

To Messrs. Walton Park Nurseries, of Walton-on-Thames, for Rhododendrons, Azaleas and other shrubs.

To Messrs. Wm. Watson, of Killiney, Co. Dublin, for Brooms.

To Messrs. Yokohama Nursery Co., of Kingsway, W.C., for Japanese dwarf trees and Kirume Azaleas.

To Messrs. Astolat Co., of Guildford, for a rock garden.

To Messrs. Robinsons' Gardens, of Eltham, S.E. 9, for a rock garden.

To Messrs. Allwood, of Haywards Heath, for a garden of Pinks.

To Messrs. Frank Cant, of Braiswick Rose Gardens, Colchester, for a Rose garden.

To Messrs. C. Engelmann, of Saffron Walden, for a Pansy garden.

To Mr. S. Farnes, of East Grinstead, for Orchids.

To Lady Carr (gr. Mr. J. T. Doe), of Walton-on-the-Hill, for Schizanthus and Coleus Hybrids.

To Mr. G. H. Dalrymple, of Bartley, Southampton, for Auriculas.

To Mr. James Douglas, of Great Bookham, for Auriculas.

To Mr. F. Everitt, of Enfield Lock, for Hippeastrum Hybrids.

To Messrs. Gurteen & Ritson, of Three Bridges, for Roses.

To Messrs. Napiers, of Taunton, for Carnations.

To Messrs. D. Prior, of Colchester, for Roses.

To Messrs. Toogood, of Southampton, for Stocks.

Silver Lindley Medal.

To Mr. Amos Perry, of Enfield, for submerged aquatics and bog plants.

Silver Hogg Medal.

To Messrs. G. Bunyard, of Maidstone, for Apples.

Flora Medals.

To the Misses A. & M. Cadell, of Longniddry, East Lothian, for a mixed group of Meconopsis species, Polyanthuses, Pinks and shrubs.

To Messrs. Clarence Elliott, of Stevenage, for a mixed group of rock-garden plants, shrubs and Anemones.

To Messrs. Hillier, of Winchester, for dwarf shrubs and rock-garden plants.

To Messrs. Hocker Edge Gardens of Cranbrook, for a mixed group of rock-garden plants and Tulips.

To Mr. Ernest Ladhams, of Godalming, for rock-garden plants.

To Messrs. Maxwell & Beale, of Broadstone, for rock-garden plants.

To Messrs. Oliver & Hunter, of Moniaive, Dumfriesshire, for rock-garden plants.

To Messrs. Wm. Wood, of Taplow, for rock-garden plants.

To Messrs. Thomas Carlile, of Loddon Nurseries, Twyford, for Lupins and other herbaceous plants.

To Messrs. Gayborder Nurseries, of Melbourne, Derbyshire, for a mixed group of herbaceous plants and shrubs.

To Messrs. Highfield Nursery Co., of Enfield, for Violas.

To Mrs. G. Anley, of Woking, for dwarf Conifers.

To Mr. F. L. White, of Polegate, for a formal garden.

To Messrs. Allwood, of Haywards Heath, for Dianthus ' Sweet Wivelsfield,' Dianthus ' Delight ' and Alpine Pinks.

To Messrs. W. Easlea, of Hockley, for Roses.

To Messrs. Keith Luxford, of Sawbridgeworth, for Carnations.

To Mr. T. Robinson, of Carlton, Nottingham, for Roses.

To Messrs. Ryder, of St. Albans, for flowering plants from seed.

To Studley College, Warwickshire, for greenhouse plants.

To Messrs. R. Tucker, of Faringdon, for Roses.

To Messrs. Wood & Ingram, of Huntingdon, for Roses.

To Messrs. Barnham Nurseries, of Barnham, for trees and shrubs.

To Mr. K. W. Harle, of Lower Basildon, Berks, for Cacti and succulents.

To Messrs. J. Southgate, of New Malden, for succulents.

To Messrs. Alpine Nurseries, of Wimborne, for rock-garden plants.

Banksian Medals.

To Messrs. Ryder, of St. Albans, for Tulips.

To Messrs. Bakers, of Codsall, for rock-garden plants.

To Mr. E. Ballard, of Colwall, nr. Malvern, for Ramondias and other rock-garden plants.

To Messrs. Bedford & Page, of Trumpington, for trough gardens.

To Messrs. Burkwood & Skipwith, of Kingston-on-Thames, for trough gardens.

To Messrs. J. Cheal, of Crawley, for rock-garden plants.

To Messrs. John Forbes, of Hawick, Scotland, for rock-garden plants.

To Mr. A. Hansen, of New Barnet, for Sempervivums.

To Mr. Reginald Kaye, of Carnforth, for rock-garden plants.

To Messrs. Letchworth Plants, of Letchworth, for rock-garden plants.

To Messrs. Marsden Nurseries, of Ashtead, for rock-garden plants.

To Messrs. Orchard Neville Nurseries, of Baltonsborough, for rock-garden plants.

To Mr. Amos Perry, of Enfield, for rock-garden plants.

To Messrs. Redgrove & Patrick, of Seal, Sevenoaks, for rock-garden plants.

To Messrs. G. Reuthe, of Keston, for rock-garden plants.

To Messrs. W. H. Rogers, of Bassett, Southampton, for rock-garden plants.

To Mr. G. R. Downer, of Chichester, for Lupins.

To Messrs. Gibson, of Cranleigh, for a mixed group of Dahlias, Irises and other Florists' Flowers.

To Mr. A. Miles, of Bickley, for a mixed group of herbaceous and rock garden plants.

To Mr. T. Robinson, of Carlton, Nottingham, for Dahlias.

To Messrs. T. Simmons, of Finchley, for Violas.

To Messrs. C. Wall, of Bath, for Aquilegias.

To Mr. G. G. Whitelegg, of Chislehurst, for a mixed group of Irises and Lilac.

To Mr. William Yandell, of Maidenhead, for Violas.

To Messrs. Allwood, of Haywards Heath, for Dianthus 'Rainbow Loveliness.'

To Mr. H. A. Brown, of South Chingford, for Fuchsias.

To Messrs. G. Bunyard, of Maidstone, for Roses.

To Messrs. Laxton, of Bedford, for Roses.

To Mr. E. B. Le Grice, of North Walsham, for Roses.

To Messrs. G. F. Letts, of Hadleigh, Suffolk, for Roses.

To Messrs. L. A. Lowe, of Crawley Down, for a mixed group of Border Carnations and Dahlias.

To Mr. Jan Spek, of Boskoop, Holland, for Roses.

To Swanley College, Swanley, for a mixed group of annuals and greenhouse plants.

To Messrs. Wheatcroft, of Ruddington, Nottingham, for Roses.

To Messrs. T. Yano, of Granville Place, W. 1, for Japanese dwarf trees.

Hogg Medals.

To Messrs. T. Rivers, of Sawbridgeworth, for fruit trees in pots.

To Messrs. Waterperry Horticultural School, of Wheatley, Oxford, for Strawberries.

COMPETITIVE EXHIBITS.

Orchid Challenge Cup, offered for the best group of Orchids shown in a space not exceeding 45 square feet.

Awarded to C. S. and A. J. W. Browning, of Cheam, Surrey.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

June 6, 1939.

Sewell Medal Competition.

The Sewell Medal for the best exhibit of three pots or pans of plants suitable for the rock garden or alpine house, exhibited by an amateur, was awarded to Mark Fenwick, Esq., V.M.H., Abbotswood, Stow-on-the-Wold. (Gr. Mr. F. Tustin.)

A Discussion on "Iris Colours—Harmony and Contrast," was opened by Miss L. F. Pesel. Chairman, Major F. C. Stern, O.B.E., M.C., F.L.S.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Orchid hybrids. Dr. Hurst showed some Odontoglossums of which two, 'Theltaur Robinhood' and 'Theltaur Maid Marion,' were seedlings of the eighth generation from the original cross and contained in their pedigree *O. crispum* 64·25 per cent., *O. nobile* 23·5 per cent., *O. luteopurpureum* 6·25 per cent. and *O. Harryanum* 6 per cent. In these seedlings *O. nobile* was not at all evident but the other three species were traceable, both *luteopurpureum* and *Harryanum* showing marked presence in form and colouring although five generations had elapsed since they were brought in.

Two other seedlings, 'Amyone Friar Tuck' and 'Amyone Little John' with the same parents and pedigree, showed no trace of either *O. luteopurpureum* or *O. Harryanum.*

Roses. Dr. Hurst also showed from Mr. E. A. Bunyard a red rose, 'Ramona,' a darker *Rosa sinica Anemone,* and a single white rose sent from Burma by Mr. Cooper. This is known as *Rosa gigantea,* Cooper's var., but the leaves are more like those of *R. laevigata* than *R. gigantea,* and Mr. Bunyard, who finds the plant hardy at Maidstone, thinks it may be a hybrid between the two.

Iris. Mr. H. P. Nicholl of Bromley sent an *Iris,* a seedling from 'Mystic' which he thought crossed with *I. sibirica,* but while the flowers were smaller and in all parts narrower than those of 'Mystic,' there were present none of the specific characters of *I. sibirica.*

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. Bunyard, F.L.S., in the Chair, and twelve other members present.

The only business of the Committee was an examination of Plum shoots the buds of which had been killed by the cold winds experienced during December.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Baker, Wolverhampton, for Lupins.
To Messrs. Bolton, Birdbrook, for Sweet Peas.

Silver-gilt Banksian Medal.
To the Rev. Canon Rollo Meyer, Little Gaddesden, for Irises.
To Messrs. Waterer, Sons & Crisp, Twyford, for Irises.

Silver Flora Medal.
To Messrs. Barr, London, for Irises, Lupins, Pyrethrums.
To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums, Irises, Lupins, etc.
To Messrs. Engelmann, Saffron Walden, for Carnations, Gerberas, Pansies.
To Messrs. Kelway, Langport, for Paeonies, Pyrethrums, Delphiniums.
To Messrs. W. H. Simpson, Birmingham, for Lupins.

Flora Medal.
To Messrs. Allgrove, Langley, for Eremuri and other herbaceous plants.
To Messrs. Bunyard, Maidstone, for Irises.
To Messrs. Bunyard, Maidstone, for old-fashioned Roses.
To Messrs. Carlile, Twyford, for Lupins.
To Messrs. Dobbie, Edinburgh, for Dahlias.
To Messrs. Homan, Oegstgeest, Holland, for Irises and Gladioli.
To Mr. E. Ladhams, Elstead, for herbaceous plants.
To Orpington Nurseries, Orpington, for Irises.
To Suffolk Seed Stores, Woodbridge, for herbaceous plants.
To Messrs. Wakeley, London, for Irises, Anemones, etc.

Banksian Medal.
To Messrs. Clark, Dover, for herbaceous plants.
To Messrs. Cutbush, Barnet, for Violas.
To Messrs. Dobbie, Edinburgh, for Sweet Peas.
To Mr. G. R. Downer, Chichester, for Lupins.
To Messrs. Feilden & Crouch, Wrotham, for Irises.
To Messrs. Gibson, Cranleigh, for Irises.
To Messrs. Harkness, Leeming Bar, for herbaceous plants.
To Messrs. Harrison, Leicester, for *Papaver nudicaule* 'Kelmscott Strain.'
To Knap Hill Nursery, Woking, for Irises.
To Mrs. D. R. Moore, Farnborough, Kent, for Pelargoniums and Fuchsias.
To Messrs. Wallace, Tunbridge Wells, for Irises and Hemerocallis.

Preliminary Commendation.

To Pæony 'Alice Harding' (votes unanimous), from Collingwood Ingram, Esq., Benenden. A double, light sulphur-yellow variety (H.C.C. 1/2) with crimson markings at the base of the petals. It was raised by M. Lemoine.

Selected for trial at Wisley.
Antirrhinum 'Foxwell Yellow Sunset,' from Mr. D. Foxwell, Balcombe.
Lupin 'Doris Waters,' from Messrs. Baker, Wolverhampton.
Lupin 'Elsie Waters,' from Messrs. Baker, Wolverhampton.
Lupin 'George Russell,' from Messrs. Baker, Wolverhampton.
Lupin 'Harmony,' from Messrs. W. H. Simpson, Birmingham.
Lupin 'Lady Diana Abdy,' from Messrs. Baker, Wolverhampton.
Lupin 'Maud Tippetts,' from Messrs. Baker, Wolverhampton.
Lupin 'Mrs. Garnet Botfield,' from Messrs. Baker, Wolverhampton.
Lupin 'Radiant Supreme,' from Messrs. W. H. Simpson, Birmingham.
Lupin 'Rapture,' from Messrs. W. H. Simpson, Birmingham.

Award Recommended after trial at Wisley:—

Award of Merit.

To Calceolaria 'Rubin,' from Mr. H. C. Hansen, "Stormly," Vanlose, Denmark. See p. 367.

Other Exhibits.
Messrs. Bolton, Birdbrook: Papaver 'Art Shades.'
Mr. W. E. Cheney, Hinckley: Pyrethrum 'Patricia.'
Mr. J. E. Dixon, Southfields: Pink 'Gloriosa.'
Messrs. Homan, Oegstgeest, Holland: Gladiolus 'Dr. Verhage.'
Mr. J. K. Jones, Evesham: Pyrethrum 'Avis Mary.'
Mrs. E. J. Kennett, West Croydon: Lobelia 'Beatrice Kennett.'
Mr. G. Murray, Staplehurst: Violas.
Major F. C. Stern, M.C., Goring-by-Sea: Paeony 'Defender.'
Messrs. Stokes, Coventry: Pyrethrum 'Whitley Pink.'
Mr. H. Tennant, Ilkley: Antirrhinums.
Walton Park Nurseries, Walton-on-Thomas: Poppies and Anchusas.
Messrs. Watkins & Simpson, London: *Aquilegia longissima* hybrids.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Waterer, Bagshot, for Rhododendrons.

Silver Banksian Medal.

To Messrs. Charlton, Tunbridge Wells, for Rhododendrons and other shrubs.

To Hocker Edge Gardens, Cranbrook, for Lilies, Irises and other hardy plants.

Lindley Medal.

To Messrs. Notcutt, Woodbridge, for a collection of Syringa species.

Flora Medal.

To Messrs. Perry, Enfield, for Lilies, Irises and other hardy plants.

To Messrs. Russell, Windlesham, for Azaleas, Clematis and other shrubs.

To Messrs. Toynbee, Barnham, for rock-garden plants.

Banksian Medal.

To Brookside Nurseries, Oxford, for alpine plants in pans.

To Messrs. Burkwood & Skipwith, Kingston, for flowering shrubs.

To Messrs. Constable, Southborough, for Alstroemerias and Sandersonias.

To Mr. K. W. Harle, Lower Basildon, for succulents.

Award of Merit.

To *Cyrtanthus Flanaganii* as a hardy flowering plant (votes 11 for), from Collingwood Ingram, Esq., Benenden. See p. 367.

To Rose ' Cantab ' as a hardy flowering shrub (votes 12 for), from the Director, University Botanic Garden, Cambridge. See p. 370.

To *Syringa* ' Audrey ' as a hardy flowering shrub (votes 14 for), from Lady Lawrence, Dorking. See p. 370.

Other Exhibits.

Anne Lady Brocket, Ware : *Moricandia sonchifolia.*

The Director, University Botanic Garden, Cambridge : *Rosa Moyesii* × *nutkana*, *R. macrophylla* × *Roxburghii.*

Messrs. Charlton, Tunbridge Wells : *Philadelphus* × *Burkwoodii.*

Mr. A. Corderoy, Eltham : rock-garden plants.

H. L. Flindt, Esq., Sutton : *Chrysanthemum rubellum*, *C. rubellum* ' Clara Curtis.'

Mrs. Hopkinson, Coulsdon : rock-garden plants.

Messrs. Jackman, Woking : flowering shrubs.

Mr J. Klinkert, Richmond : clipped trees.

Lady Lawrence, Dorking : *Syringa* ' Virgilia.'

Captain G. K. Mooney, Sevenoaks : *Ceanothus* sp.

Lt.-Col. G. S. F. Napier, Horeham : *Syringa* ' Isabella.'

Messrs Notcutt, Woodbridge : *Syringa reflexa* var. *pallens.*

The Hon. Mrs. Spender Clay, Lingfield : *Meconopsis betonicifolia* var. *pratensis.*

Walton Park Nurseries, Walton : rock-garden plants.

Widbrook Nurseries, Cookham : rock-garden plants.

ORCHID COMMITTEE.—Dr. F. Craven Moore in the Chair, and twelve other members present.

Award Recommended :—

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group of Orchids.

Other Exhibits :

Worthing Nurseries, Horsham : Odontoglossum hybrids.

JOINT RHODODENDRON COMMITTEE.—Mr. W. J. Bean, V.M H., in the Chair, and twelve other members present.

Awards Recommended :—

Award of Merit.

To *Rhododendron* × ' Antonio ' (*R. discolor* × *R.* × ' Gill's Triumph ') (votes 8 for), from Lionel de Rothschild, Esq., Exbury, Southampton. See p. 370.

To *R.* × ' Angelo ' var. ' Solent Queen ' (*R. discolor* × *R. Griffithianum*) (votes 9 for), from Lionel de Rothschild, Esq. See p. 369.

Other Exhibits.

Lionel de Rothschild, Esq. : *R.* × ' Avocet ' (*R. discolor* × *R. Fortunei*), and foliage of various *R. neriiflorum* hybrids.

Captain A. Maitland-Dougall, R.N., Lynwood, Woodham Lane, Woking : *R.* × ' Happiness ' (*R. Fortunei* seedling).

The Rt. Hon. Lord Swaythling, Townhill Park, Southampton : *R. albiflorum* in flower.

Sir John Stirling-Maxwell, Bt., Pollok House, Pollokshaws, Glasgow : *R.* × ' Jock ' (*R. Griersonianum* × *R. Williamsianum*).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and ten other members present.

Award Recommended :—

Cultural Commendation.

To Miss H. M. Berry, Enfield, for a pan of *Saponaria pumila.*

Other Exhibits.

Mrs. G. Anley, Woking : *Campanula pilosa* var. *dasyantha.*

Miss H. M. Berry, Enfield : *Paederota Bonarota, Melandrium Hookeri* × *M. pulchrum.*

Dr. Roger Bevan, Henley-on-Thames : *Linaria Tournefortii.*

Mrs. T. McConnell, Belfast : *Primula serratifolia.*

Dr. N. W. Jenkin, Hindhead : *Heliosperma micrantha.*

IRIS SOCIETY'S SHOW.

JOINT IRIS COMMITTEE.—Major F. C. STERN, O.B.E., in the Chair, and twelve other members present.

Awards Recommended :—

Preliminary Commendation.

To *Iris sibirica* ' Thorpe Glory ' (votes unanimous), from Viscountess Byng of Vimy, Thorpe-le-Soken.

Selected for trial at Wisley.

Iris sibirica ' Thorpe Glory ' and *I. sibirica* ' Thorpe Ring Dove,' both from Viscountess Byng of Vimy, Thorpe-le-Soken.

Iris ' June Crystal,' from Miss L. F. Pesel, Winchester.

Iris ' Cairngorm ' and Seedling S. 223, both from F. Burton, Esq., Hildenborough.

Iris ' Songs before Sunrise,' ' Rose of England,' ' Killiney,' and ' Clothing of Delight,' all from B. R. Long, Esq., Birmingham.

Iris ' Joan Lay,' from H. Chadburn, Esq., Saxmundham.

Iris Seedling 410, from G. P. Baker, Esq., Sevenoaks, Kent.

Iris ' Mingtoy,' from F. W. Tomalin, Esq., Hampton.

Other Exhibits.

H. P. Nicholls, Esq., Bramley : *Iris sibirica* × *I.* ' Mystic ' ♀ ?

F. Wynn Hellings, Esq., Esher, Surrey : *Iris* ' Persia ' and ' By Jove.'

Collingwood Ingram, Esq., Benenden : *Iris filifolia* (**A.M.** 1915).

JOINT DELPHINIUM COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

There were no exhibits before the Committee on this occasion.

JUNE 13, 1939.

JOINT DELPHINIUM COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Award of Merit.

To Delphinium ' Percy Godfrey ' as a variety for exhibition (votes 6 for), from Mr. F. A. Bishop, Clewer Green, Windsor. See p. 368.

Selected for trial at Wisley.

Delphinium ' Percy Godfrey,' from Mr. F. A. Bishop, Windsor.

June 20, 1939.

Shrub Competition for Amateurs.

Class A.—8 varieties of hardy shrubs in bloom, 1 vase of each, not more than 2 varieties of any one genus.

First Prize, £3 : To the Rt. Hon. Lord Swaythling, West End, Southampton. (Gr. Mr. F. J. Rose.)

Second Prize, £2 5*s*. : To Lionel de Rothschild, Esq., O.B.E., V.M.H., Exbury. (Grs. Mr. F. Hanger and Mr. R. Findlay.)

Third Prize, £1 10*s*. : To Mrs. A. Desborough, Tulgey Wood, Broadstone, Dorset.

Class B.—1 vase of a hardy shrub in bloom.

First Prize, £1 : To G. P. Baker, Esq., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks.

Second Prize, 15*s*. : To H. H. Crane, Esq., F.L.S., Highmead, Cheney Lane, Eastcote, Middlesex.

Third Prize, 10*s*. : To Lady Lawrence, Riverdale, Dorking.

A Lecture was given by Sir Arthur Hill, K.C.M.G., F.R.S., V.M.H., on "Pelargoniums." Chairman, Prof. F. E. Weiss, D.Sc., LL.D., F.R.S., F.L.S. See p 353.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Iris sibirica.—Dr. Barnes showed photographs illustrating the occurrence of pentamery in *Iris sibirica*, which he believed might have arisen from a bimerous and a normal flower, after fusion of the parts, as indicated by the apparent division of a thick flat stalk and in the ovary. Dr. Barnes also reported the occurrence of bimerous and tetramerous flowers of this species occurring at Kew in plants he had examined.

Lilium candidum.—Dr. Barnes reported the occurrence of flower buds in the axil of bracteoles of *Lilium candidum* ; the subsidiary florets arose from the lower pedicels only. Branching in *Lilium candidum salonikae* was also reported by the Chairman, who had segregated seeds of this Lilium and found that the seedlings also bore branched inflorescences.

Lilium Henryi.—Dr. Tincker showed variegated leaves of *Lilium Henryi*. The leaves of one rank of the flowering shoot were entirely white ; those of other ranks were striped green and white. In previous years this particular plant had produced normal foliage.

Cladothamnus pyrolaeflorus.—Flowering and fruiting specimens of this Ericaceous shrub were before the Committee, sent by the Trustees of the Benmore Gardens, nr. Dunoon. Amongst peculiarities shown by the floral parts was observed the curious bending of the style. This is an upright much-branched shrub with leaves obovate-oblong and narrowed towards the base, with five oblong pink petals yellow towards the end of petal.

Pittosporum Ralphii.—A variegated form of this shrub was shown by Mr. A. H. Williams, Maple House, Roffey, Horsham, who reported that the plant had been raised as a seedling from a normal plant. The variegated form proved hardy in the severe conditions experienced in the winter of 1938–1939.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Bees, Chester, for herbaceous plants.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

Silver-gilt Flora Medal.

To Messrs. Baker, Wolverhampton, for Lupins.
To Messrs. Bath, Wisbech, for Pæonies.
To Messrs. Prichard, Christchurch, for herbaceous plants and Water Lilies.
To Messrs. Waterer, Sons & Crisp, Twyford, for Pæonies.

Silver-gilt Banksian Medal.

To Messrs. Barr, London, for herbaceous plants.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Silver Banksian Medal.

To Messrs. Bunyard, Maidstone, for Pæonies, Delphiniums and old-fashioned Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations, Gerberas and Pansies.

To Messrs. Kelway, Langport, for Pæonies and Delphiniums.

To Mr. E. Ladhams, Elstead, for hardy border Pinks.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

Flora Medal.

To Mr. W. E. B. Archer & Daughter, Sellindge, for Roses.

To Draycott Flower Farm, Campden, for Astilbes.

To Marsden Nurseries, Ashtead, for Pinks and other hardy plants.

To Mr. A. Perry, Enfield, for Hemerocallis and other hardy plants.

To the Director, Royal Botanic Gardens, Kew, for Pelargoniums.

Banksian Medal.

To Messrs. Carlile, Twyford, for herbaceous plants.

To Messrs. Forbes, Hawick, for Pelargoniums.

To Mrs. Montefiore and Mrs. J. Hammond, Culworth, for Pelargoniums.

To Messrs. Wheatcroft, Nottingham, for Roses.

Selected for trial at Wisley.

Lupin 'Jane Ayr,' from Messrs. Baker, Wolverhampton.

Lupin 'M 25,' from Messrs. Baker, Wolverhampton.

Pink 'Clan Graham,' Pink 'Clan McGregor,' Pink 'Clan McLeod,' from Messrs. Hayward, Clacton-on-Sea.

Awards Recommended after trial at Wisley :—

Award of Merit.

To Dianthus 'Emperor,' from Mr. E. Ladhams, Elstead Nurseries, Godalming. See p. 368.

Highly Commended.

Dianthus 'Ariel,' from Mr. E. Ladhams, Elstead Nurseries, Godalming. See p. 368.

Dianthus 'Ceres,' from Mr. E. Ladhams, Elstead Nurseries, Godalming. See p. 368.

Other Exhibits.

Mrs. Hopkinson, Coulsdon : Heucheras and other hardy plants.
Mrs. D. R. Moore, Farnborough, Kent : Pelargoniums.
Mr. F. Scott, Arnside : Violetta 'Arnside.'
Mr. A. Langley Smith, Catford : miniature scented Pelargoniums.
Messrs. Wheatcroft, Nottingham : Rose 'Lady Trent.'
Widbrook Nurseries, Cookham : Delphiniums.
Mr. S. Williams, London : Dianthus 'Beechdale' and Pink 'Jewel Seedling.'

FLORAL COMMITTEE B.—Mr. C. T. Musgrave, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Constable, Burnham, for Lilies.

To Mr. W. J. Marchant, Wimborne, for flowering shrubs.

Flora Medal.

To Messrs. Russell, Windlesham, for Clematis, Maples and Nymphæas.

To Messrs. Wallace, Tunbridge Wells, for Lilies and Irises.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston, for flowering shrubs.

To Dartington Hall, Ltd., Totnes, for Primulas.

To Mr. A. Hansen, New Barnet, for rock-garden plants.

To Messrs. Hillier, Winchester, for rock-garden plants.

To Mr. J. Klinkert, Richmond, for clipped trees.

Award of Merit.

To *Asystasia bella* as a flowering shrub for the cool greenhouse (votes 11 for, 1 against), from Lt.-Col. C. H. Grey, D.S.O., Cranbrook. See p. 367.

To *Epilobium angustifolium* 'Isobel' as a hardy flowering plant (votes unanimous), from Messrs. Perry, Enfield. See p. 368.

To *Eriophorum Scheuchzeri* as a hardy ornamental-fruited aquatic plant (votes 9 for, 4 against), from Messrs. Perry, Enfield. See p. 368.

To *Gaulnettya* × 'Wisley Pearl' as a hardy flowering shrub (votes unanimous), from the Director, R.H.S. Gardens, Wisley. See p. 368.

To *Indigofera decora alba* as a hardy flowering plant (votes 6 for, 2 against), from Mr. W. J. Marchant, Wimborne. See p. 369.

To *Lilium* 'Picotee' as a hardy flowering plant (votes 6 for, 1 against), from Messrs. Constable, Burnham. See p. 369.

To *Orchis elata* as a hardy flowering plant (votes 10 for), from Mrs. Sadleir, Celbridge, Co. Kildare. See p. 369.

To *Pentstemon secundiflorus* as a hardy flowering plant (votes 14 for), from the Director, R.H.S. Gardens, Wisley. See p. 369.

To *Prunus Persica foliis rubris* as a hardy ornamental foliage tree (votes 10 for, 2 against), from Messrs. Russell, Windlesham. See p. 369.

Preliminary Commendation.

To *Cypripedium spectabile album* as a hardy flowering plant (votes unanimous), from Messrs. Perry, Enfield.

To *Lapeyrousia corymbosa* as a tender flowering plant (votes unanimous), from Lt.-Col. C. H. Grey, D.S O., Cranbrook.

Other Exhibits.

Trustees of Benmore Gardens, Argyll: *Cladothamnus pyrolaeflorus.*

Capt. C. E. Benson, D.S.O., Shawford: *Lilium Davidi* var. *Willmottiae.*

Mrs. Gerald Buxton, Theydon Bois: *Nepeta* hybrid.

Messrs. Constable, Burnham: *Lilium amabile* var. *luteum, L.* 'Violet M. Constable,' *L. japonicum* × *L. auratum.*

Mrs. W. Francillon, Lyme Regis: *Leptospermum scoparium* seedlings.

Mrs. Fullerton, Godalming: *Salvia spp.*

Knap Hill Nursery, Woking: *Lonicera* × *grata, Pieris mariana.*

Mr. W. J. Marchant, Wimborne: *Galax aphylla, Leptospermum Nichollii* 'Gloriosa.'

Lt.-Col. G. S. F. Napier, Horam: *Lilium concolor* var. *racemosum.*

Messrs. Perry, Enfield: *Cypripedium spectabile, Lilium pumilum.*

L. de Rothschild, Esq., Exbury: *Ozothamnus ledifolius.*

E. F. Warburg, Esq., Epsom: *Vaccinium cylindraceum.*

Widbrook Nurseries, Cookham: rock-garden plants.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven other members present.

Awards Recommended:—

Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group of Orchids.

To Messrs. Stuart Low, Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Cypripedium* × 'Miracle' var. 'Alpha' (*C.* × 'Nubian' × ?) (votes 11 for), from H. P. Lawson, Esq., Lynbrook, Knaphill, Woking. See p. 367.

To *Miltonia* × 'Melina' var. 'Purple Queen' (*M.* × 'Memoria H. T. Pitt' × *M.* × 'Mrs. J. B. Crum') (votes 8 for, 4 against), from Messrs. McBean, Cooksbridge. See p. 369.

Cultural Commendation.

To Ernest R. Ashton, Esq. (gr. Mr. A. Everest), 'Broadlands' Tunbridge Wells, for *Epidendrum prismatocarpum* with nine many-flowered spikes.

Other Exhibits.

H. Barnard-Hankey, Esq., East Burnham Park, Slough: *Odontoglossum* × 'Viscountess Ullswater.'

JOINT RHODODENDRON COMMITTEE.—Lord STRATHCONA AND MOUNT ROYAL in the Chair, and ten other members present.

Exhibits.

Lord Digby, Minterne, Cerne Abbas, Dorset: *Rhododendron* × 'Jaquetta' (*R. facetum* × *R. Griersonianum*) (*to be seen again*).

Lionel de Rothschild, Esq., Exbury, Southampton: *R.* × 'Isabella' (*R. auriculatum* ♀ × *R. Griffithianum* ♂); and an unnamed hybrid (*R. eriogynum* ♂ × *R.* T.L. 6758 ♀).

JOINT ROCK-GARDEN PLANT COMMITTEE.—F. C. STERN, Esq., F.L.S., in the Chair, and four other members present.

Exhibits.

Mrs. G. Anley, Woking: *Dicentra peregrina* var. *pusilla* f. *alba.*
Mr. A. Corderoy, Eltham: *Campanula Poscharskyana* var. *lilacina.*
Messrs. Hillier, Winchester: *Erysimum linifolius fl. pl.*
Mr. E. Ladhams, Elstead: *Campanula Portenschlagiana* 'Elstead Blue.'

JOINT IRIS COMMITTEE.—Major F. C. STERN, O.B.E., in the Chair, and six other members present.

Exhibits.

Mrs. Sadleir, Temple Mills, Celbridge, Co. Kildare: *Iris versicolor kermesina* form.

V. A. Babcock, Esq., Gledhow Wood, The Chase, Kingswood: *Iris versicolor* form.

JOINT DELPHINIUM COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and nine other members present.

Award Recommended:—

Award of Merit.

To Delphinium 'Ellen Wort,' for exhibition (votes 7 for, 2 against), from Mrs. B. G. Wort, Upper Woodcote Village, Purley, Surrey. See p. 367.

Other Exhibits.

Mrs. B. G. Wort, Purley, Surrey: Delphinium 'Emily Wort.'
Suffolk Seed Stores, Woodbridge: Delphinium 'Kingston Blue.'
Mrs. Fullerton, Polshot Farm, Elstead, Surrey: Delphinium 'Polshot White.'

JOINT DELPHINIUM COMMITTEE.—British Delphinium Society's Show.—Mr. T. HAY, V.M.H., in the Chair, and ten other members present.

Awards Recommended:—

Award of Merit.

To Delphiniums 'Bluebell,' for exhibition (votes 8 for); 'Violetta,' for exhibition (votes 9 for); 'Crystal,' for exhibition (votes 9 for); and 'Myra,' for exhibition (votes 9 for), all from Messrs. Blackmore & Langdon, Bath.

Selected for trial at Wisley.

Delphiniums 'Bluebell,' 'Crystal,' 'Myra' and 'Regina,' all from Messrs. Blackmore & Langdon, Bath.

Delphinium 'H. C. Stanford,' from Messrs. Goodliffe, Bishops Stortford.

Delphinium 'Beryl,' from H. A. Perkins, Esq., Lane House, Bognor Regis.

Other Exhibits.

W. Holland, Esq., Sandell's House, West Amesbury: Delphinium 'Nancy Holland.'

Messrs. Blackmore & Langdon, Bath: Delphinium 'Perseus.'

Messrs. Goodliffe, Bishops Stortford: Delphiniums 'Stapleford,' 'Clavering,' 'Shelford,' and 'Hallingbury.'

Mrs. White, Courtfield Crescent, Harrow: Delphiniums 'E. J. Herbert' and 'Mrs. White.'

BOOKS AND PAMPHLETS ADDED TO THE LIBRARY IN THE YEAR ENDING DECEMBER 31, 1938.

(*Cont. from p.* lxxxiv.)

Pontedera, Guilio. Anthologia, sive de floris natura libri tres . . . accedunt ejusdem dissertationes XI. Illus. 8vo. Padua, 1720. (1)

Posthumous, O. The ferns of Surinam and of French and British Guiana. 8vo. Passeroean, 1928. (1)

Praeger, Robert Lloyd. The way that I went. Illus. 8vo. Dublin & London, 1937. (1)

Pyle, Robert. *See* McFARLAND, J. H. How to grow roses.

Quin, Charles W. Garden receipts. 8vo. 4th ed. 1901.

Raley, William. A practical essay on the management of potatoes; or, a new method of preventing the disorder thereof, called curl'd tops. 8vo. 1782. (1)

Ramaley, Francis. *See* ROBBINS, W. W. Plants useful to man.

Rathlef, Harald von. Die Rose als Objekt der Züchtung. Illus. 8vo. Jena, 1937. (4)

—— *See* BOERNER, F., & OTHERS. Laubgehölze.

Ray, John. Further correspondence. *See* RAY SOCIETY. Publications. 1928.

Ray Society. Publications. Further correspondence of JOHN RAY. Ed. by ROBERT W. T. GUNTHER. Illus. 8vo. 1928. (1)

Reichenbach, Heinrich Gottlieb Ludwig. Monographia generis Aconiti . . . Latine et Germanice elaborata. Col. pls. fol. Leipzig, 1820[–21]. (1)

Riley, N. D. Foreword. *See* STOKOE, W. J. The observer's book of British butterflies.

Robbins, Wilfred W., & Ramaley, Francis. Plants useful to man. 2nd ed. Illus. 8vo. Philadelphia, 1937. (1)

Robinson, Gilbert Wooding. Mother Earth, being letters on soil addressed to . . . R. G. STAPLEDON. Illus. 8vo. 1937. (4)

Robinson, William. The English flower garden. 5th ed. Illus. 8vo. 1897. (C)

—— The wild garden. Illus. by ALFRED PARSONS. 4th ed. Illus. 8vo. 1894. (C)

Roemer, Theodor Ernst Martin, & others. Die Züchtung resistenter Rassen der Kulturpflanzen, von TH. ROEMER, W. H. FUCHS & K. ISENBECK. Col. pls. Illus. 8vo. Berlin, 1938. (1)

Rolland, Eugène. Flore populaire ou histoire naturelle des plantes dans leurs rapports avec la linguistique et le folklore. Vols. 1–6. 8vo. Paris, 1896–1906. (1)

Rosenberg, Johann Carl. Rhodologia seu philosophico-medica generosae Rosae descriptio. 2nd ed. 8vo. Frankfurt am Main, 1631. (1)

Royal Gardeners' Orphan Fund. A short history. By A. C. B[ARTLETT]. Illus. 4to. [1938.]

Russell, Paul. The oriental flowering cherries (U.S. Dept. Agr. Circ., 313). Illus. 8vo. Washington, D.C., 1934.

Safford, William E. Daturas of the Old World and New: an account of their narcotic properties and their use in oracular and initiatory ceremonies. (Ann. Rep. Smithson. Inst., 1920.) Illus. 8vo. n.p., [1921].

St. John, Harold. Flora of south-eastern Washington and adjacent Idaho. Illus. 8vo. Pullman, Wash., 1937.

Saint-Lager, Jean Baptiste. Catalogue des plantes vasculaires de la flore du bassin du Rhône. 8vo. Lyons, Geneva & Basle, [1873–]1883. (1)

Salisbury, Edward James. *See* FRITSCH, F. E., & SALISBURY, E. J. Plant form.

Saunders, William. A new dispensatory. *See* CULPEPER, N. Culpeper's English family herbal. 1792.

Sauvage, Georges. Les rosiers et les roses ; leur exploitation commerciale. Illus. 8vo. La Hestre, (1936).

Savage, Spencer. *Ed.* Caroli Linnaei determinationes. *See* LONDON. LINNEAN SOCIETY. Catalogue of the manuscripts. Part 2.

Schellenberg, Gustav. Connaraceae. *See* ENGLER, A. Das Pflanzenreich, 103 (iv. 127).

Seabrook, William Pertwee. Modern fruit growing. 5th ed. Illus. 8vo. 1936. (2)

Seboth, Joseph. *Illus.* Alpine plants painted from nature : the text by F. GRAF, with an introduction on the cultivation of alpine plants by J. PETRASCH. *Edited* by ALFRED W. BENNETT. Series i–iv. 4 vols. Col. pls. 8vo. (1879–1880.) (C)

Sharples, Ada White. Alaska wild flowers. Illus. 8vo. (1938.) (4)

Shenstone, William. [Life.] *See* HUMPHREYS, A. R. William Shenstone.

Širjaev, Grigorij Ivanovič. *Onobrychis* generis revisio critica. (Publ. Fac. Sci. Univ. Masaryk, 56, 76.) Illus. 8vo. Brno, 1925–26.

—— Supplementum ad monographiam *Onobrychis* generis revisio critica. (Bull. Soc. bot. Bulg., iv.) 8vo. Sofia, 1931.

Širjaev, G. Supplementum ii ad *Onobrychis* generis revisio critica. (Publ. Fac. Sci. Univ. Masaryk, 242.) 8vo. Brno, 1937.

—— De Albi serie sect. *Orobus* gen. *Lathyrus*, 2. (Bull. Ass. Russ. Rech. Sci. Prague, v.) 8vo. Prague, 1937.

Skofitz, Alexander. *Ed.* *See* OESTERREICHISCHE BOTANISCHE ZEITSCHRIFT.

Smith, *Sir* James Edward. Papers. *See* LONDON. LINNEAN SOCIETY. Catalogue of the manuscripts. Part 1.

Smith, Johannes Jacobus. Enumeration of the Orchidaceae of Sumatra and neighbouring islands. (Fedde, Rep., xxxii.) 8vo. Berlin, 1933. (1)

Smith, *Sir* William Wright, & Cave, George Herbert. The vegetation of the Zemu and Llonakh valleys of Sikkim. (Rec. Bot. Surv. India, iv. 3.) Illus. 8vo. Calcutta, 1911.

Smythe, Francis Sydney. The valley of flowers. Col. pls. 8vo. (1938.)

Solly, Violet Norbury, *Miss*. Gardens for town and suburb. Col. pl. Illus. 8vo. 1926. (4)

South African garden manual. 6th ed. Illus. 8vo. Cape Town & Wynberg, 1933. (4)

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Spencer, Stanley John. Dahlias : growing, showing, choosing, types, diseases, origin. Illus. 8vo. [Hockley, Essex, 1937.] (2)

Stearn, William Thomas. *Epimedium* and *Vancouveria* (Berberidaceae), a monograph. (Journ. Linn. Soc. Bot., li.) Illus. 8vo. 1938. (2)

Steer, E. J. *Illus.* *See* BOLUS, H. M. L., & OTHERS. A second book of South African wild flowers.

Steven, Christian von. Verzeichniss der auf der taurischen Halbinsel wildwachsenden Pflanzen. (Bull. Soc. Imp. Naturalistes Moscou, xxix–xxx.) Illus. 8vo. Moscow, (1856–)1857.

Stilson, William Walworth. *Illus.* *See* CLUTE, W. N. Our ferns.

Stoker, Fred. A gardener's progress. Illus. by H. A. THOMERSON. Illus. 8vo. (1938.) (4)

Stokoe, William John. The observer's book of trees and shrubs of the British Isles. Col. pls. Illus. 8vo. (1938.) (4)

—— The observer's book of British butterflies. Foreword by N. D. RILEY. Col. pls. Illus. 8vo. (1938.) (4)

Stout, Arlow Burdette. Some new hybrid lilies of promise. (Journ. N.Y. Bot. Gard.) Illus. 8vo. [New York], 1937. (2)

Strömberg, Reinhold. Theophrastea. Studien zur botanischen Begriffsbildung. (Göteborgs Vetensk.-Samh. Handl., ser. 5. A, vi.) 8vo. Göteborg, 1937. (1)

Stuart, Muriel, *Mrs.* Gardener's nightcap. Illus. by PHILIP GOUGH. Illus. 8vo. (1938.) (4)

Studio, The. Gardens and gardening, 1938. Ed. by F. A. MERCER. Col. pls. Illus. 8vo. [1938.] (4)

Sudell, Richard. Herbaceous borders and the waterside. Col. pl. Illus. 8vo. 1938. (4)

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Swaney, Miller W. *See* ELLIS, C., & SWANEY, M. W. Soilless growth of plants.

Swartley, John C. The eastern hemlock [*Tsuga canadensis*] and its varieties. (Arborist's News, iii.) 8vo. n.p., 1938. (2)

Symons, Jelinger. Synopsis plantarum insulis Britannicis indigenarum. 8vo. 1798.

Takeda, Hisayoshi. Alpine flowers of Japan : descriptions of one hundred select species, together with cultural methods. Illus. 8vo. Tokyo, 1938. (4)

Taylor, Norman. A guide to the wild flowers east of the Mississippi and north of Virginia. Col. pls. Illus. 8vo. Garden City, N.Y., (1928). (1)

Teixeira de Mattos, Alexander. *Transl. See* MAETERLINCK, M. The double garden.

Theophrastus. *See* STRÖMBERG, R. Theophrastea.

Thimann, Kenneth V. *See* WENT, F. W. Phytohormones.

Thomas, F. Inigo. *Illus. See* BLOMFIELD, R. The formal garden.

Thomerson, Harold Arthur. *Illus. See* STOKER, F. A gardener's progress.

Traité de la culture des pêchers. *See* [COMBLES, — DE].

Travers, Émile. Introduction. *See* LE PAULMIER, J Traité du vin.

Trollope, Mark Napier. Arboretum Coreense, being a preliminary catalogue of the vernacular names of . . . the commonest trees and shrubs found in Chosen. (Trans. Korea Branch Roy. Asiat. Soc., ix–xi.) 8vo. n.p., [1918–20].

Turrill, William Bertram. *Ed. See* ATCHLEY, S. C. Wild flowers of Attica.

Verrill, A. Hyatt. Foods America gave the world. Appendices in collaboration with OTIS W. BARRETT. Col. pl. Illus. 8vo. Boston, Mass., (1937). (1)

Walker, Egbert H. *See* MERRILL, E. D. A bibliography of eastern Asiatic botany.

Walther, August Friedrich. Designatio plantarum quas hortus August. Friderici Waltheri . . . complectitur accedunt novae plantarum icones. Illus. 8vo. Leipzig, 1735. (1)

Watkins, Thomas. The art of promoting the growth of the cucumber and melon. 4to. 1824.

Weeden, John. A practical treatise on the growth of cucumbers. Illus. 4to. Uxbridge, (1832).

Wells, A. Laurence. The microscope made easy. Illus. 8vo. (1938.) (4)

Went, F. W., & Thimann, Kenneth V. Phytohormones. Illus. 8vo. New York, 1937.

Whiteman, Ralph J. *Ed.* Hexton : a parish survey made and compiled by the senior scholars of the Herts. C.C. School, Hexton. With a foreword by R. L. HINE. Illus. 8vo. n.p., 1936. (2)

Wilson, Ernest Henry. The vegetation of Korea. (Trans. Korea Branch Roy. Asiat. Soc., ix.) Illus. 8vo. n.p., [1918].

Wright, E. C. Barton-. *See* BARTON-WRIGHT, E. C.

Wright, R. Patrick. Introduction. *See* HENDERSON, R. The young estate manager's guide.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

JUNE 20, 1939.

FRUIT AND VEGETABLE COMMITTEE.—Mr. H. BARNETT in the Chair, and eleven other members present.

Exhibits.

Mr. A. Bayley, Orchard Bungalow, Lent Rise, Burnham, Bucks : Strawberry 'Bayley's Record.'

Mr. G. S. Dunn, The Hame, Redbourn, Herts : Strawberry 'Redbourn.'

JULY 4, 1939.

LILY COMPETITION FOR AMATEURS.

CLASS A.—6 species and/or hybrids of Lilium.

First Prize, £2 : To Rt. Hon. Lord Swaythling, Southampton. (Gr. Mr. F. J. Rose.)

Second Prize, £1 10s. : To Dr. Amsler, Hawkhurst.

CLASS B.—1 stem of Lilium.

First Prize, £1 : To Rt. Hon. Lord Swaythling.

Second Prize, 15s. : To Miss P. Dimsdale, Lechlade.

Third Prize, 10s. : To Dr. Amsler.

A discussion took place between members of the Lily Group during the afternoon.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Rosa campanulata. Mr. E. A. Bunyard showed a white Rose from Mr. Robert James' garden at St. Nicholas, Richmond, Yorks, which he thought was the Rose called in Redouté's Roses, 4to ed., *R. campanulata*, and which was evidently a hybrid, perhaps between *R. damascena* and *R. spinosissima*.

Roses. He also showed a single Rose which had come to him from Iceland under the name of *Rosa gallica* with magenta flowers and which was evidently not of pure *gallica* blood, but possibly a hybrid between *gallica* and *rugosa* or *gallica* and *cinnamomea*. For comparison he showed *R. gallica splendens*, a double dark crimson variety. See p. cxii.

Erica cinerea var. Miss E. Armitage sent a curious form of *Erica cinerea* with narrow tubular deep red flowers, but otherwise similar in leaf and stem to the type She had found it among many thousands of the type on moraine detritus at Creag Doil about ten miles from Fort William, Inverness-shire.

Vanda Roxburghii. Mr. Percy Lancaster of Alipur, Calcutta, sent a piece of *Vanda Roxburghii* with malformed flowers growing where usually a leaf bud arises. The growth was too dry and perished to make out in what the malformation actually consisted.

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. BUNYARD, F.L.S., in the Chair, and eight other members present.

Exhibits.

Mr. Lionel de Rothschild, Exbury, Southampton : Strawberries 'Duchess of Kent' and an unknown variety.

R.H.S. Commercial Fruit Trials, Wisley : Strawberry 'Corvallis.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.
To Messrs. Bath, Wisbech, for Pæonies and other hardy plants.
To Messrs. Dobbie, Edinburgh, for Roses.

Silver Flora Medal.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Barr, London, for herbaceous plants.
To Messrs. Engelmann, Saffron Walden, for Carnations, Zinnias, etc.

Flora Medal.
To Mr. W. E. B. Archer and Daughter, Sellindge, for Roses.
To Messrs. Bentall, Havering, for Roses.
To Messrs. Clark, Dover, for Eremuri and Alstroemerias.

Banksian Medal.
To Messrs. Bunyard, Maidstone, for old-fashioned Roses.
To Messrs. Carlile, Twyford, for herbaceous plants.
To Messrs. Jackman, Woking, for herbaceous plants and shrubs.
To Mr. E. B. Le Grice, North Walsham, for Roses.
To Messrs. D. R. Moore, Farnborough, Kent, for Pelargoniums and Fuchsias.
To Messrs. Neale, Solihull, for Dahlias and Border Carnations.
To Messrs. Wall, Bath, for Border Carnations.

Selected for trial at Wisley.
Pink ' A. J. Macself,' from Messrs Clarence Elliott, Stevenage.
Scabiosa caucasica ' Challenger ' and *S. caucasica* ' Loveliness,' from Mr. G. B. M. Souter, Chichester.

Other Exhibits.
Mr. S. Barker, Epsom : *Campanula Moerheimii.*
Mr. E. B. Le Grice, North Walsham : Roses ' Judith ' and ' Little Miss Muffet.'
Mr. F. R. McQuown, London : Dianthus ' Vega.'
Mr. O. Palmer, Soham : Clarkia.
Mr. A. Perry, Enfield : Hemerocallis.
Mr. A. Langley Smith, Catford : Lathyrus ' Sunset ' and scented Pelargoniums.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :—

Gold Medal.
To the Rt. Hon. Lord Swaythling, Southampton, for Lilies.

Silver-gilt Flora Medal.
To Messrs. Constable, Burnham, for Lilies.

Silver Flora Medal.
To Messrs. Prichard, Christchurch, for Nymphaeas and herbaceous plants.

Flora Medal.
To Mr. A. Hansen, New Barnet, for rock garden plants.
To Mr. E. Ladhams, Elstead, for Alstroemerias.

Banksian Medal.
To Messrs. Burkwood & Skipwith, Kingston, for flowering shrubs.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Messrs. Waterer, Twyford, for rock garden plants.

Award of Merit.
To *Lilium amabile* var. *luteum* as a hardy flowering plant (votes 17 for), from Messrs. W. A. Constable. See p. 431.
To *Nerium Oleander carneum fl. pl.* as a flowering shrub for the cool greenhouse (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 431.

Selected for Trial at Wisley.
Clematis Viticella ' Etoile Rose,' from Mark Fenwick, Esq., J.P., Stow-on-the-Wold.

Other Exhibits.

Cobham Hall Estate Co., Cobham : *Lupinus cytisoides.*
Mr. A. Corderoy, Eltham : rock garden plants.
Dr. F. W. Crossman, Bristol : *Nuttallia cerasiformis.*
Four Oaks Nursery, Uckfield : rock garden plants.
Mrs. Hopkinson, Coulsdon : rock garden plants.
Lady Lowndes, Ringwood : *Lilium polyphyllum.*
Messrs. Perry, Enfield : *Dionaea muscipula.*
Lord Swaythling, Southampton : *Lilium* 'Sumhill.'

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group of Orchids.

Award of Merit.

To *Cycnoches aureum*, Sander's var. (votes 12 for), from Messrs. Sanders, St. Albans. See p. 430.

JOINT RHODODENDRON COMMITTEE.—Lord STRATHCONA AND MOUNT ROYAL in the Chair, and six other members present.

Exhibits.

Lionel de Rothschild, Esq., Exbury, Southampton : *Rhododendron* × 'Ayah' (*R. discolor* × *R. eriogynum*) ; *R.* × 'Dragonfly' (*R. auriculatum* × *R. facetum*) (to be seen again) ; and *R. Thayerianum.*

JOINT ROCK-GARDEN PLANT COMMITTEE.—F. C. STERN, Esq., F.L.S., in the Chair, and ten other members present.

Awards Recommended :—

Award of Merit.

To *Campanula Scheuchzeri* 'Covadonga' as a flowering plant for the rock garden (votes 9 for), from Messrs. Clarence Elliott, Stevenage. See p. 429.

Preliminary Commendation.

To *Sutera brevifiora* (mauve form) as a flowering plant for the rock garden (votes unanimous), from Mrs. Helen A. Milford, Chedworth.

Selected for Trial at Wisley.

Dianthus 'Hazel,' sent by Major H. J. J. Stern, Templecombe, Somerset.

Other Exhibits.

Mrs. Robert Lukin, Mortimer : *Campanula Zoysii, Putoria calabrica.*

Mrs. H. A. Milford, Chedworth : *Lobelia sp., Streptocarpus pusilla, Sutera sp.* No. 781, *Wurmbea sp.*, collection of ferns from Basutoland.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. E. CHARRINGTON in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To Border Carnation 'Duke of Kent,' for exhibition (votes 6 for), from Messrs. Allwood, Haywards Heath. See p. 429

Selected for Trial at Wisley.

Carnation 'Duke of Kent' from Messrs. Allwood.
Carnation 'Wm. Thorburn' from Mr. J. J. Keen, Southampton.
Carnations 'Sadie Mercer' and 'Hilda Moody' from R. Thain, Esq., Shalford, nr. Guildford.

Other Exhibit.

R. Thain, Esq., Shalford : Carnation Seedling.

JOINT DELPHINIUM COMMITTEE.—Mr. D. INGAMELLS in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To Delphiniums 'Bluestone' and 'Darkie,' both for exhibition (votes 6 for in each case), both sent by Miss C. I. Marshall, Saltwood, Hythe, Kent. See p. 430.

Selected for Trial at Wisley.

Delphiniums ' Porthos ' and ' Titania ' from Messrs. Blackmore and Langdon of Bath.

Other Exhibits.

Mrs. F. C. Minoprio, Broadlands, Ascot, Berks: Delphiniums ' Camella,' ' Master Peter,' ' Master Michael,' ' Miss Cynthia ' and ' R. Minoprio.'

JOINT IRIS COMMITTEE.—F. C. STERN, Esq., F.L.S., in the Chair, and five other members present

There were no exhibits before the Committee on this occasion.

JULY 11, 1939

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. E. CHARRINGTON in the Chair, and five other members present.

Awards Recommended :—

Award of Merit.

To Border Carnations ' Gertrude Anderson,' ' June Thain ' and ' Muriel Hawtin,' all for exhibition (votes in each case 6 for), shown by R. Thain, Esq., Thatch Lossum, Shalford, nr. Guildford. See p. 429.

Preliminary Commendation.

To Border Carnation ' Pixie ' (votes 6 for), from E. Charrington, Esq., Icewood Cottage, Limpsfield, Surrey.

Selected for trial at Wisley.

Border Carnations ' Gertrude Anderson,' ' June Thain ' and ' Muriel Hawtin,' all from R. Thain, Esq., Shalford, nr. Guildford.

Border Carnation ' Pixie,' from E. Charrington, Esq., Limpsfield, Surrey.

JULY 18, 1939.

LILY COMPETITION FOR AMATEURS.

CLASS A.—3 hybrids of Lilium.

First Prize, £1 10*s.* : To F. C. Stern, Esq., Goring. (Gr. Mr. J. Buckman.)
Second Prize, £1 : To Rt. Hon. Lord Swaythling.
Third Prize, 15*s.* : To Lady Beatrix Stanley, Market Harborough.

CLASS B.—1 stem of Lilium.

First Prize, £1 : To F. C. Stern, Esq., Goring.
Second Prize, 15*s.* : To Lady Beatrix Stanley.
Third Prize, 10*s.* : To Rt. Hon. Lord Swaythling.

The Banksian Medal offered for award at the Meetings on July 4 and July 18 for the best hybrid Lily, which had not received a Certificate of Preliminary Commendation, an Award of Merit or a First Class Certificate beforehand, was awarded to F. C. Stern, Esq., Goring, for Lilium × ' Sybil Stern.'

CLAY CUP COMPETITION.

The Clay Cup, which was offered for award for a new Rose possessing the true old rose scent, was awarded to Messrs. Alex. Dickson & Sons, Ltd., Newtownards, Co. Down, for Rose ' Dr. F. G. Chandler.'

A lecture was given by Mr. A. A. FINCHAM, on "Fuchsias." Chairman, Mr. A. D. COTTON, O.B.E., F.L.S.

SCIENTIFIC COMMITTEE.—Mr E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Rose Hybrid. The rose referred to at the last meeting (see p. cix) had been examined by Dr. Hurst, who reported that it had the woolly style of *Rosa cinnamomea* ; the numerous styles of *R rugosa* · the axillary flowers of *R. cinnamomea* ; the fragrance of *R rugosa* and *R. cinnamomea* ; the prickles of *R. cinnamomea* , the same petal as in *R. rugosa* ; and the bracts of *R. cinnamomea*. He concluded that it was a cross between these two species. It showed no trace of *R. gallica*.

Couch penetrating a rubber ball. Another specimen of this phenomenon was shown where several stolons had grown through a soft crepe rubber ball of about the size of a tennis ball.

Sweet William showing spiral torsion. Mr. E. A. Bowles showed a shoot of Sweet William, fasciated and spirally twisted.

Plants for naming. A species of Galtonia had been referred to this Committee from the Rock Garden Committee and it appeared to agree well with descriptions and figures of *G. clavata*. This had been collected by Mrs. Milford in S. Africa. Mr. Musgrave sent a Composite which is probably *Rydbergia grandiflora* from Montana, but which, in the absence of fruits, could not be accurately determined.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. Secrett, F.L.S., in the Chair, and eight other members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To Messrs. J. C. Allgrove, Middle Green, Langley, Slough, for an exhibit of Gooseberries and Currants.

Selected for trial at Wisley.

Strawberry 'Aromatic' from Mr. T. E. Smiles, Chartway Street, East Sutton, nr. Maidstone.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Artindale, Sheffield, for Eremuri.

Silver Flora Medal.

To Messrs. Dickson, Newtownards, for Roses.
To Mr. J. Douglas, Great Bookham, for Border Carnations.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Phloxes and Delphiniums.
To Messrs. F Cant, Colchester, for Roses.
To Mr. A. Hurran, Gloucester, for Fuchsias.
To Messrs. McGredy, Portadown, for Roses.
To Messrs. Prichard, Christchurch, for herbaceous plants.
To Messrs. Stewart, Ferndown, for herbaceous plants.

Flora Medal.

To Mr. W. E. B. Archer & Daughter, Sellindge, for Roses.
To Mr. H. A. Brown, South Chingford, for Fuchsias.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Hillier, Winchester, for herbaceous plants.
To Mr. E. B. LeGrice, North Walsham, for Roses.
To Col. Mitchell (gr. Mr. E. Simmonds), Mill Hill School, for two specimen Fuchsias 'Marinka.'
To Mr. H. Woolman, Birmingham, for Begonias.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. J. & A. Bentall, Havering, for Roses.
To Messrs. Buckwell, St. Mary Cray, for Roses.
To Messrs. Carlile, Twyford, for herbaceous plants.
To Messrs. G. & A. Clark, Dover, for herbaceous plants.
To Messrs. Kelway, Langport, for Paeonies and Gladioli.
To Mr. E. Ladhams, Elstead, for Pinks and Alstroemerias.
To Messrs. Laxton, Bedford, for Roses.
To Marsden Nurseries, Ashtead, for Pinks and other hardy plants.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Mrs. D. R. Moore, Farnborough, for Pelargoniums and Fuchsias.
To R. Newman, Esq., Dartmouth, for Fuchsias.
To Messrs. Warner, Boxted, for Roses.
To Mr. W. Yandell, Maidenhead, for Violas.

Award of Merit.

To Carnation 'Fidelity' as a variety for exhibition (votes unanimous), from Messrs. R. Bibby, Singleton, nr. Blackpool. See p. 429.

To Delphinium 'Bridesmaid' as a variety for exhibition (votes 11 for, 1 against), from Messrs. Blackmore & Langdon, Bath. See p. 430.

The two plants mentioned above were transferred to Floral Committee A from the Joint Perpetual-Flowering Carnation Committee and the Joint Delphinium Committee respectively.

Selected for trial at Wisley.

Delphinium 'Bridesmaid,' from Messrs. Blackmore & Langdon, Bath.

Delphinium 'Neptune,' from Messrs. Blackmore & Langdon, Bath.

Marigold (Mexican) 'Harvest Moon,' from Messrs. Watkins & Simpson, London.

Other Exhibits.

Messrs. Allwood, Haywards Heath: Pink 'Goliath,' *Dianthus Allwoodii* 'Stephanie.'

Mr. A. E. Blake Amos, Colchester: Rose 'Eclipse.'

Mr. W. E. B. Archer & Daughter, Sellindge: Rose 'Du Barri.'

Mrs. Warren Crowe, Fawley Green: white and crimson Mallows.

Mrs. Hopkinson, Coulsdon: herbaceous plants.

Mr. C. J. Howlett, Earley: Fuchsias.

Iden Nurseries, Staplehurst: Violas.

Mr. E. B. LeGrice, North Walsham: Roses 'Sincerity' and 'Little Miss Muffet.'

Mr. H. G. Longford, Marcham: Catananches and *Chelone barbata.*

Messrs. McGredy, Portadown: Roses 'Poulsen's Copper' and 'Lady Moyra Cavendish.'

T. Newman, Esq.: Lewdown: Fuschias.

Messrs. Prichard, Christchurch: *Campanula celtidifolia,* Prichard's variety.

Mr. H. P. Read, Brundall: *Chrysanthemum maximum* 'Pauline Read.'

Widbrook Nurseries, Cookham: herbaceous plants.

Mr. F. L. White, Willingdon: hardy plants.

FLORAL COMMITTEE B.—Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty other members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Constable, Burnham, for Lilies.

Silver-gilt Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for Lilies and other herbaceous plants.

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Lilies and Carnations.

Lindley Medal.

To D. Boyes, Esq., Cambridge, for an exhibit of ten forms of a Lily resulting from a cross between *Lilium* × *testaceum* and *L. chalcedonicum.*

Flora Medal.

To Mr. A. Hansen, New Barnet, for Sempervivums and Campanulas.

To Messrs. Perry, Enfield, for Hemerocallis and other herbaceous plants.

To Messrs. Russell, Windlesham, for Astilbes, Nymphaeas and Ixoras.

Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for succulents.

To Mr. J. Klinkert, Richmond, for clipped trees.

Award of Merit.

To *Heliconia rostrata* as a flowering plant for the stove (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 430.

To *Lilium* × 'Shuksan' as a hardy flowering plant (votes 12 for, 4 against), from F. C. Stern, Esq., Goring-by-Sea. See p. 431.

To *Schizophragma hydrangeoides rosea* as a hardy flowering climbing shrub (votes 13 for, 4 against), from Messrs. Hillier, Winchester. See p. 431.

Other Exhibits.

Alpine Gardens, Findon: rock-garden plants.

Mr. S. Boothman, Maidenhead: rock-garden plants.

Messrs. Constable, Burnham: *Lilium* × *burnhamense, L. regale album.*

Mr. A. Corderoy, Eltham: rock-garden plants.

Messrs. Prichard, Christchurch: *Senecio Doria.*

Messrs. Southgate, New Malden: succulents.

F. C. Stern, Esq., Goring-by-Sea: *Lilium* × 'Sybil Stern.'

His Honour Judge Woodcock, K.C., London, N.W. 3: *Lilium* × *aurelianense.*

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and twelve other members present.

Awards Recommended :—

First-class Certificate.

To *Vanda teres alba*, Gatton Park var. (votes 10 for), from Sir Jeremiah Colman, Bart., Gatton Park, Surrey. See p. 432.

Award of Merit.

To *Odontonia* × 'Ibran,' East Burnham Park var. (*Odontonia* × 'Dorina' × *Odontoglossum* × 'Serapis') (votes unanimous), from H. Barnard-Hankey, Esq., East Burnham Park, Slough. See p. 431

To *Vuylstekeara* × 'Susa' (*Odontonia* × 'Dora' × *Odontioda* × 'Gwentara'; (votes unanimous), from H. S. Wharton, Esq., "Shalstone," Templewood Avenue, Hampstead, N.W. 3. See p. 432.

Brassia Gireoudiana. The *Brassia* species which received an Award of Merit on May 16, 1939, and is referred to on p. 330 and p. xc, has been identified as *Brassia Gireoudiana.*

JOINT ROCK-GARDEN PLANT COMMITTEE.—F. C. STERN, Esq., F.L.S., in the Chair, and ten other members present.

Awards Recommended :—

Preliminary Commendation.

To *Campanula cashmiriana* as a flowering plant for the alpine house (votes unanimous), from Mrs. H. A. Milford, Chedworth.

To *Lysimachia pseudo-Henryi* as a flowering plant for the rock garden (votes unanimous), from Messrs. Prichard, Christchurch.

To *Wahlenbergia* × *Corderoyi* (*Matthewsii* × *alboviolacea*) as a flowering plant for the rock garden (votes 9 for), from Mr. A. Corderoy, Eltham.

Other Exhibits.

Mr. S. Boothman, Maidenhead : *Hypericum ericoides.*

Lt. Col. C. H. Grey, Cranbrook : *Campanula* × *rotarvatica, Gladiolus namaquensis.*

Mr. A. Hansen, New Barnet : *Campanula pusilla* × *rotundifolia.*

Mr. E. Ladhams, Elstead : *Lupinus confertus.*

Mrs. H. Milford, Chedworth : *Galtonia clavata, Rhodohypoxis rubella, R sp.*

C. T. Musgrave, Esq., Godalming : N. American Composite for naming.

F. C. Stern, Esq , Goring-by-Sea : *Gentiana Waltonii.*

Messrs. Stewart, Ferndown : *Brodiaea minor.*

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. E. CHARRINGTON in the Chair, and nine other members present.

Awards Recommended :—

First-class Certificate.

To Border Carnation 'Winifred Knapton,' as an exhibition variety (votes 7 for, 2 against), from H. A. Knapton, Esq., "Rosecroft," Fairfield Road, Orpington. See p. 430.

Award of Merit.

To Border Carnations 'Kathleen Davis' and 'Margaret Beresford,' both for exhibition (votes 8 for in each case), both from R. Thain, Esq., Shalford, nr. Guildford. See p. 429.

To Border Carnation 'Allan Knapton,' for exhibition (votes 6 for, 2 against), from H. A. Knapton, Esq., Orpington. See p. 429.

Preliminary Commendation.

To Border Carnations 'Cottage Perfection,' 'Cottage Glow,' 'Rose Marie,' 'Orange Glow' and 'Mauve Monarch' (votes unanimous), all from Messrs. Allwood, Bros., Haywards Heath.

To Border Carnations 'Lilian Hill,' and 'Malvina Souch' (votes unanimous), from C. F. Hill, Esq., Small Heath, Birmingham.

To Border Carnation 'Amelia Storr' (votes unanimous), from J. Spence Storr, Esq., Bush Hill Park, Middx.

To Border Carnation 'Eileen Stevens' (votes unanimous), from R. Thain, Esq., Shalford.

Selected for Trial at Wisley.

Border Carnations 'Sussex Evening,' 'Cottage Perfection,' 'Cottage Glow,' 'Cottage Picture,' 'Winsome,' 'Orange Glow,' 'Mauve Monarch' and 'Nectar Clove,' all from Messrs. Allwood, Bros., Haywards Heath.

Border Carnations 'Lilian Hill' and 'Malvina Souch,' from C. F. Hill, Esq., Birmingham.

Border Carnations 'Amelia Storr,' from J. Spence Storr, Esq., Bush Hill Park, Middx.

Border Carnations 'Margaret Beresford,' 'Kathleen Davis,' and 'Eileen Stevens,' from R. Thain, Esq., Shalford.

Other Exhibits.

C. S. Cox, Esq., Langley: Border Carnation 'Thora Cox.'

Messrs. Allwood Bros., Haywards Heath: Border Carnations 'Goldilocks, 'Melody,' 'B. 86 E.,' 'Royalist' and 'Jungle Fire.'

I. L. Barker, Esq., Mansfield, Notts.: Border Carnation 'Mansfield Clove.'

C. F. Hill, Esq., Birmingham: Border Carnations 'William Rowland Hill' and Seedling No. 1.

C. J. Rush, Esq., Birmingham: Border Carnation 'Francis Robot.'

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

JULY 25, 1939.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. F. CHARRINGTON in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To Border Carnations ' Julia B. Wells ' and ' Harriet Harrow,' as exhibition varieties (votes 6 for in each case), from E. Charrington, Esq., Icewood Cottage, Limpsfield, Surrey. See p. 480.

To Border Carnation ' Inez Blair,' for exhibition (votes 6 for), from R. Thain, Esq., Thatch Lossum, Shalford, Nr. Guildford. See p. 480.

Preliminary Commendation.

To Border Carnations ' White Flaked Scarlet ' and ' Blush Pink Self ' (votes 6 for in each case), from I. L. Barker, Esq., Peel Crescent, Bull Farm, Mansfield, Notts.

To Border Carnation ' Millfield ' (votes 6 for), from J. J. Keen, Esq., The Avenue, Southampton.

To Border Carnations ' Cottage Jewel ' and ' Cottage Warrior ' (votes 6 for in each case), from Messrs. Allwood Bros., Haywards Heath.

Selected for Trial at Wisley.

Border Carnations ' I. Barker,' ' White Flaked Scarlet ' and ' Blush Pink Self,' all from I. L. Barker, Esq., Mansfield, Notts.

Border Carnation ' Millfield,' from J. J. Keen, Esq., Southampton.

Border Carnations ' Talisman,' ' Nox,' ' Sussex Favourite,' ' Cottage Jewel,' ' Cottage Warrior ' and ' Evening Glow,' all from Messrs. Allwood Bros., Haywards Heath.

Border Carnation ' Inez Blair,' from R. Thain, Esq., Shalford, Nr. Guildford.

Other Exhibits.

I. L. Barker, Esq., Mansfield, Notts : Border Carnations ' Butterfly', ' White Self Seedling ' and ' White Flaked Purple Seedling.'

Messrs. Allwood Bros., Haywards Heath : Border Carnations ' Cottage Ruby,' ' Sussex Crimson,' ' Sussex Maroon,' ' Sussex Beauty,' ' Cottage Orange,' ' Cottage Gem,' ' Sussex Flame ' and ' Sussex Flake.'

AUGUST 1, 1939.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.R.E.S., F.L.S., V.M.H., in the Chair, and four other members present.

Abnormal Foxglove. The inflorescence of a Foxglove was sent by Mrs. Gordon, of Elstead, Surrey, in which the pedicels had elongated, had branched and sometimes branched again, producing long shoots with bracts somewhat of the nature of those seen in the wheat-ear carnation, but branched.

Growth Substances and Potatos. Mr. T. C. Laws, of Kirk Ella, Batchworth Hill, Rickmansworth, sent samples of Potatos which had been raised from pieces soaked in Hortomone A for 48 hours, others for 24 hours and grown under glass together with controls. The treated plants did not yield so heavily as the controls. A slight retardation of development was also observed.

Growth Substances and Cuttings. Dr. Tincker showed cuttings of *Viburnum fragrans*, which treated with indolyl-butyric-acetic acid 1/30,000 and tetra-hydronaphthylidene-acetic acid 1/30,000 for 24 hours on May 31, had rooted 95 per cent. in 21 days, whereas control cuttings had not rooted in 28 days.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, F.L.S., V.M.H., n the Chair, and eight other members present.

Award Recommended :—

Silver Hogg Medal.

To Mr. R. F. W. Cartwright, Aynho Park, Banbury, Oxon, for an exhibit of Peach ' Peregrine ' and Nectarine ' Pine Apple.'

Other Exhibits.

Lady Leconfield, Petworth Park, Petworth : Red Currant ' Laxton's No. 1,' and White Currant ' White Versailles.'

R.H.S. Commercial Fruit Trials, Wisley : Apples ' Arthur Turner,' ' Beauty of Bath,' ' Early Victoria ' and ' Lodi.' Plums ' Black Prince ' and ' Early Rivers.' Damson ' Early Rivers.'

FLORAL COMMITTEE A.—Mr. W. R. OLDHAM, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Daniels, Norwich, for Larkspurs.

To the Donard Nursery Co., Newcastle, N. Ireland, for Dieramas.

Silver Flora Medal.

To Mr. E. Ladhams, Elstead, for herbaceous plants and Water Lilies.

To Napsbury Hospital (gr. Mr. W. J. Jennings), St. Albans, for Campanulas and other greenhouse plants.

To Mr. A. Perry, Enfield, for uncommon hardy plants.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Bath, Wisbech, for Phlox, Gladioli, and other hardy plants.

To Messrs. Blackmore & Langdon, Bath, for Phlox and other herbaceous plants.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Kelway, Langport, for Gladioli.

To Mr. H. Woolman, Birmingham, for Begonias.

Flora Medal.

To Mr. W. E. B. Archer & Daughter, Sellindge, for Roses.

To Messrs. Buckwell, St. Mary Cray, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations, Lilies, etc.

To Mr. E. B. Le Grice, North Walsham, for Roses.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Messrs. Wakeley, London, for Gladioli.

Banksian Medal.

To Messrs. Clark, Dover, for herbaceous plants.

To Cobham Hall Estate Nurseries, Cobham, for Monardas.

To Messrs. Hillier, Winchester, for herbaceous plants.

To Knap Hill Nurseries, Woking, for herbaceous plants and shrubs.

To Mrs. D. R. Moore, Farnborough, for Pelargoniums and Fuchsias.

To Mr. A. Miles, Bickley, for herbaceous plants.

To Mr. W. Yandell, Maidenhead, for Violas.

Selected for trial at Wisley.

Campanula ' Enfield Blue ' from Mr. S. J. Tyler, Enfield.

Dahlia ' Tone,' from Messrs. Spencer, Hockley.

Dianthus ' Sally ' from Messrs. Allwood, Haywards Heath.

Gladiolus ' Bronze Wing,' from Mr. A. E. Blake-Amos, Colchester.

Gladiolus ' Vagabond Prince,' from Mr. A. E. Blake-Amos, Colchester.

The following awards were recommended after trial at Wisley.

Award of Merit.

To *Chrysanthemum maximum* ' Everest,' from Mr. F. Yeoman, Leeming, Northallerton, Yorkshire.

To *Chrysanthemum maximum* ' Pauline Read,' from Mr. H. P. Read, Brundall, Norfolk.

Highly Commended.

To *Tradescantia virginica* ' Leonora,' from Messrs. Prichard, Christchurch.

To *Tradescantia virginica* ' Osprey,' from Messrs. Prichard, Christchurch.

To *Veronica incana* ' Wendy,' from Messrs. T. Carlile, Twyford, Berks.

Other Exhibits.

Mrs. Hopkinson, Coulsdon : hardy plants.

Messrs. Kelway, Langport : Gladiolus 'Folk Dance' and G. 'Good Companion.'

Mr. A. Perry, Enfield : *Asclepias tuberosa* 'Gerbe d'Or.'

Lady Strafford, Barnet : Ivy-leaved Pelargonium.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Flora Medal.

To Messrs. Russell, Windlesham, for Nymphaeas and Astilbes.

Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for succulents.

Award of Merit.

To *Asteranthera ovata* as a flowering plant for the cold house or for a sheltered wall in the open (votes 13 for), from Colonel Stephenson R. Clarke, C.B., Haywards Heath. See p. 480.

To *Dracocephalum Stewartianum* as a hardy flowering plant (votes 12 for), from the Director, Royal Botanic Gardens, Kew. See p. 481.

Other Exhibits.

G. Cave, Stevenage : *Lilium* × *sulphurgale* 'Evelyn Cave.'

Mr. A. Corderoy, Eltham : rock garden plants.

Messrs. Hillier, Winchester : *Plagianthus Lyallii ribifolia.*

Mr. E. Ladhams, Elstead : *Buddleia* 'Ariel.'

Lieut.-Col. L. C. R. Messel, Handcross : *Schizophragma hydrangeoides.*

Messrs. Perry, Enfield : *Anemonopsis macrophylla, Callirhoe involucrata, Erigeron alpinus major.*

L. de Rothschild, Esq., Exbury : *Lyonia ovalifolia.*

Lady Strafford, Barnet : *Thunbergia alata.*

ORCHID COMMITTEE.—Sir Jeremiah Colman, Bart., in the Chair, and eleven other members present.

No awards were recommended on this occasion.

Exhibits.

Sir William Cooke, Bart., Hampstead Norris : *Odontioda* × 'Duchess of York,' with a branched spike of about 100 scarlet flowers.

Colonel E. Middleton Perry, Sunnyside, Wimbledon : *Cypripedium* × *Gowerianum* var. *brugense.*

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. Stern, O.B.E., M.C., in the Chair, and seven other members present.

Award Recommended :—

Preliminary Commendation.

To *Solidago Virgaurea minutissima* as a hardy flowering plant for the rock garden (votes 6 for), from Mrs. Gwendolyn Anley, Woking.

Other Exhibit.

H. Clifford Crook, Esq., Bromley : *Campanula versicolor* var. *tomentella.*

Gladiolus Competition for Amateurs.

Class A.—For 6 varieties of large-flowered Gladioli, those with most open flowers being preferred.

1. Mr. R. H. Hall, Worthing.

Class B.—For 6 varieties of large-flowered Gladioli, those with the largest individual flowers being preferred.

1. Mr. J. E. Suckling, Upminster.

Class C.—For 6 varieties of *primulinus* type.

1. Mr. J. E. Suckling, Upminster.

The *Foremarke Gladiolus Cup* was won by Messrs. Kelway of Langport, Somerset.

August 15, 1939.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Habenaria viridis.—Mr. Odell showed specimens of the Frog orchid, *Habenaria viridis*, from Princes Risborough, now flowering freely.

Cestrum nocturnum.—A flowering specimen of *Cestrum nocturnum* collected in Tangier was sent for identification. The small long-tubed flowers open at night when they are strongly scented.

Lonicera × *americana.*—A Lonicera with flowers tinged purple without and golden yellow within, with all upper leaves connate was sent by Lord Mostyn from his garden in Flintshire. Mr. A. B. Jackson later identified it as *L.* × *americana* (= *L. Caprifolium* × *L. etrusca*)

Tillandsia sp.—Mr. C. H. Lankester sent a species of Tillandsia which proved to be near *T. pulchra* but could not be more exactly identified.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. Secrett, F.L.S., V.M.H., in the Chair, and nine other members present.

Exhibits.

Mr. W. Geddes, Blairhill, Rumbling Bridge, Kinross-shire: Gooseberry 'Blairhill Cottar.'

Messrs. Laxton, Nurserymen, Bedford: Plum 'Chieftain.'

Lady Leconfield, Petworth Park, Petworth: Apricots 'New Large Early,' 'Peach,' and 'Shipley'; 'Nectarine Humboldt'; Peaches 'Peregrine' and 'Royal George.'

R.H.S. Commercial Fruit Trials, Wisley: Apples 'Early McIntosh,' 'Macross,' 'Melba,' 'Millers' Seedling,' and 'Red Astrachan'; Plum 'Bountiful.'

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and eleven other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Konynenburg & Mark, Noordwyk, Holland, for Gladioli.

Silver-gilt Flora Medal.

To Messrs. Kelway, Langport, for Gladioli.

Silver Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for Begonias, Delphiniums and Phlox.

To Messrs. Wakeley, London, for Gladioli.

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Stewart, Ferndown, for Gladioli and other hardy plants.

To Captain B. Symons-Jeune, Old Windsor, for Phlox.

Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. B. R. Cant, Colchester, for Roses.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Mr. A. Miles, Bickley, for herbaceous plants.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Mr. H. Woolman, Birmingham, for Begonias.

Banksian Medal.

To Messrs. Bentall, Havering, for Roses.

To Messrs. Carlile, Twyford, for herbaceous plants.

To Mrs. H. W. Hall (gr. Mr. Suff), Lymington, for Gladioli.

To Widbrook Nurseries, Cookham, for herbaceous plants.

Award of Merit.

To Begonia 'A. T. Shardlow' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 480.

To Begonia 'Golden Queen' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 480.

To Begonia 'N. F. Barnes' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 480.

Selected for trial at Wisley.

Gladioli 'Badische Flagge,' 'Buffette,' 'Champlain,' 'King Lear,' 'Myrna,' 'Ostende,' 'Prelude,' all from Mr. A. E. Blake-Amos, Colchester.

Solidago 'Leneralis,' from Miss A. Walkden, The Raft, Sale.

Other Exhibits.

Mr. A. Falconer, Stalybridge: *Lobelia* 'Queen Victoria Improved,' **A.M.** 1938, after trial at Wisley.

Mr. W. Geddes, Rumbling Bridge: *Veronica virginica* ' 'Coral Spire.'

Mr. J. L. Holbrook, Chingford: Gladioli 'Llanporth' and 'Nanette.'

Mrs. Hopkinson, Coulsdon: herbaceous plants.

Messrs. Ingham, Thornton-le-Street: *Chrysanthemum maximum* var.

Miss G. F. Lacy, Hampstead: seedling Delphinium.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Russell, Windlesham, for greenhouse foliage and flowering plants.

Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for succulents.

Flora Medal.

To Messrs. Hillier, Winchester, for flowering shrubs and lilies.

To Messrs. Perry, Enfield, for hardy flowering plants and ferns.

Award of Merit.

To *Lilium medeoloides*, as a hardy flowering plant (votes 6 for), from E. Kenneth Wilson, Esq., Wimbledon. See p. 482.

To *Hydrangea serrata rosalba*, as a hardy flowering plant (votes unanimous), from Lt.-Colonel L. C. R. Messel, Handcross, Sussex. See p. 482.

Preliminary Commendation.

To *Orchis* sp. (collected by E. K. Balls in Mexico), as a cool-house flowering plant (votes 9 for), from Lt.-Colonel L. C. R. Messel, Handcross, Sussex.

Cultural Commendation.

To the Director the John Innes Horticultural Institute, Merton, for *Columnea microphylla* as a stove-house flowering and foliage plant (votes unanimous).

Other Exhibits.

Mr. A. Corderoy, Eltham: rock garden plants.

Messrs. Lanes Nurseries, Ltd., Berkhamsted: Conifers.

L. de Rothschild, Esq., Exbury: *Rhododendron* 'Europa.'

Mr. T. Hay, C.V.O., London: *Cedronella cana.*

Lt.-Col. L. C. R. Messel, Handcross: *Hydrangea macrophylla Mariesii* var. *lilacina.*

Dr. Balfour, Gourley, Cambridge: *Begonia gracilis, Milla biflora.*

Chas. F. Hill, Esq., Hillingdon: *Arctotis grandis.*

ORCHID COMMITTEE.—Eight members in attendance. No formal sitting of the Committee took place, as no Orchids were exhibited.

JOINT DAHLIA COMMITTEE.—Mr. T. Hay, V.M.H., C.V.O., in the Chair, and six other members present.

Dahlias selected for trial at Wisley.

'Peerless' (to be renamed), 'Queen Marjorie,' 'Slaidburn,' 'Towneley Cockade,' from Mr. J. F. Barwise, Towneley Nurseries, Burnley.

'Blaze,' 'Kingcup,' 'Leslie Thomas,' 'Original,' 'Rev. Harold Key,' 'Springtime,' from Messrs. J. Stredwick, St. Leonards-on-Sea.

'Diana Hay,' 'Early Bird,' from Mr. J. T. West, Brentwood.

Dahlias were also submitted by Mr. A. Falconer, Stalybridge, and Messrs. J. F. Spencer, Hockley.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. C. H. Curtis, V.M.H., in the Chair, and ten other members present.

Selected for trial at Wisley.

'Bellahouston Gem,' from Mr. A. Aitchinson, Berelands Nursery, Rutherglen.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and seven other members present.

Award Recommended :—

Award of Merit.

To Carnation 'Tauntonian,' for market (votes unanimous), from Messrs. Napiers, Stepswater Nurseries, Taunton. See p. 480.

Other Exhibits.

Messrs. Napiers, Taunton : 'Napier's Scarlet,' and 'Napier's Sunshine.'

JOINT ROCK-GARDEN PLANT COMMITTEE.—F. C. STERN, Esq., F.L.S., in the Chair, and eight other members present.

Exhibit.

Mrs. V. Higgins, Croydon : *Laurentia tenella.*

AUGUST 29, 1939.

SCIENTIFIC COMMITTEE.—There was no meeting of this Committee on this occasion.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, F.L.S., V.M.H., in the Chair, and six other members present.

Exhibits.

Mr. G. Cave, 85 Fairview Road, Stevenage, Herts : seedling Apple.

The Director, John Innes Horticultural Institute, Mostyn Road, Merton Park, S.W. 19 : Blackberries 'John Innes' and 'Merton Thornless.'

Mr. W. Fifield, Syndale, Faversham, Kent : seedling Plum.

Mr. A. H. Hall, Hollybrush Nursery, Chestnut Lane, Amersham : seedling Apple.

R.H.S. Commercial Fruit Trials, Wisley : Apples 'George Neal' and 'Melba,' Plum 'La Delicieuse.'

Mr. C. H. Walkden, 8 Cecil Road, Mitcham : Apple 'Mitcham Wonder.'

Mr. R. A. Whiting, 172 Shirehall Road, Hawley, Nr. Dartford : seedling Apple No. 31.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Kelway, Langport, for Gladioli.
To Messrs. Carter Page, London, for Dahlias.

Silver-gilt Banksian Medal.

To Mr. S. Ogg, Swanley, for Dahlias.
To Messrs. Wakeley, London, for Gladioli.

Silver Flora Medal.

To Messrs. Brown & Such, Maidenhead, for Dahlias.
To Captain B. Symons-Jeune, Old Windsor, for Dahlias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Cheal, Crawley, for Dahlias.
To Mr. A. Perry, Enfield, for Kniphofias.
To Messrs. Prichard, Christchurch, for herbaceous plants.

Flora Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. A. Miles, Bickley, for herbaceous plants.

Banksian Medal.

To Messrs. Bentall, Havering, for Roses.
To Messrs. Carlile, Twyford, for herbaceous plants.
To Messrs. Clark, Dover, for herbaceous plants.

Selected for trial at Wisley.

Aster (Callistephus) 'Triumph of the Market,' Rose.
" " " " " Cinnabar Red.
" " " " " Lilac Mauve.
" " " " " White.

} All from Messrs. Watkins & Simpson, London.

Awards Recommended after trial at Wisley :—

Award of Merit.

To *Gypsophila paniculata* ' Flamingo,' sent by Messrs. Baker, Wolverhampton. See p. 480.

To *Heliopsis gigantea*, sent by Messrs. Carlile, Twyford. See p. 481.

Other Exhibits.

Messrs. Allwood, Haywards Heath : Blue Dianthus (*Dianthus barbatus* var.).

Mrs. Hopkinson, Coulsdon : herbaceous plants.

FLORAL COMMITTEE B.—Mr. W. J. BEAN, C.V.O., V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Floral Medal.

To Messrs. M. Prichard, Christchurch, for rock-garden plants.

To Messrs. Cheal, Crawley, for flowering shrubs.

Banksian Medal.

To Mr. F. Southgate, New Malden, for succulents.

To Mr. K. D. Harle, Lower Basildon, for succulents.

Other Exhibits.

The Director, R.H.S. Gardens, Wisley : *Statice rosea*, *Erica cinerea* ' Colligan Bridge.'

Messrs. W. A. Constable, Burnham, Bucks : *Lilium* × *burnhamense*.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and five other members present.

No awards were recommended.

Exhibits.

Lionel de Rothschild, Esq., Exbury : *Laeliocattleya* × ' Fiesta.'

Messrs. Black & Flory, Slough : *Laeliocattleya* × ' Braemar.'

JOINT DAHLIA COMMITTEE.—Mr. J. B. RIDING in the Chair, and ten other members present.

Selected for trial at Wisley.

' Anson,' ' Blenheim,' ' Lysander,' ' Mrs. Rose Lawrence,' from Messrs. Brown & Such, Maidenhead.

' Annamonea,' ' Magentic,' from Messrs. Spencer, Hockley.

' Dot,' ' Lady Morton Smith,' ' Mist,' ' Sir Malcolm,' from Messrs. Stredwick, St. Leonards-on-Sea.

Dahlias were also submitted by Messrs. Ballego, Leiden, Holland ; Mr. J. F. Barwise, Burnley ; Mr. A. J. Cobb, Reading ; Mr. H. J. Woolley, Birmingham.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. G. W. LEAK, V.M.H., in the Chair, and eight other members present.

Exhibits.

Mr. E. Riley, Alfreton, Derbyshire : ' Alfreton Delight,' ' Utility ' (to be renamed), ' Alick Winson,' ' Autumn Tints ' (to be renamed), ' Alfreton Wizard ' and ' Dusky.'

Mr. H. Lowe, Tibshelf, Derbyshire : ' Delight ' and ' Pioneer ' (both to be renamed).

Mr. W. H. Dixson, Broadbridge Heath : ' Terra-cotta Precoce.'

JOINT ROCK-GARDEN PLANT COMMITTEE.—Lady LAWRENCE in the Chair, and eleven other members present.

Award Recommended :—

Preliminary Commendation.

To *Phlox longifolia*, as a hardy flowering plant (votes 6 for), from Dr. P. L. Giuseppi, Felixstowe.

Other Exhibits.

Dr. P. L. Giuseppi, Felixstowe : *Viola Curtisii* var., *Sedum Chanettii*, *Gaultheria Veitchiana*.

SEPTEMBER 19, 1939, at Wisley.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. D. INGAMELLS in the Chair, and nine other members present.

Award Recommended :—

Award of Merit.

To 'Marigold,' for exhibition (votes 8 for), from Mr. H. Shoesmith, Mayford Woking.

To 'Corona,' for exhibition (votes 8 for) and 'Brimstone,' for exhibition (votes 8 for), both from Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

Selected for trial at Wisley.

'Marigold,' 'Cinnamon' and 'Trixie,' from Mr. H. Shoesmith.

'Corona,' 'Brimstone,' 'Fire Glow,' 'Colleen,' 'Autumn Glow' and 'Lancer, from Messrs. Johnson.

Other Exhibits.

Messrs. Johnson : 'Mavourneen,' 'Orion' and 'Snow White.'

Mr. H. Shoesmith : 'Phoebus' and 'Primrose.'

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

SEPTEMBER 28, 1939.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. D. INGAMELLS in the Chair, and nine other members present.

Awards Recommended :—

Award of Merit.

To 'Mavourneen,' for exhibition (votes unanimous); 'E. Crossley,' for exhibition (votes 8 for); and 'Golden West,' for exhibition (votes 8 for, 1 against). All from Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

To 'Harbour Light,' for exhibition (votes unanimous), from Mr. H. Shoesmith, Mayford, Woking.

Selected for trial at Wisley.

'Mavourneen,' 'Golden West,' and 'Mavis,' all from Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

'Harbour Light,' 'Sweetness,' 'Bridesmaid' and 'Evening Glow,' all from Mr. H. Shoesmith, Mayford, Woking.

Other Exhibits.

Messrs J. & T. Johnson, Tibshelf: 'Letia' and 'Spitfire.'

Mr. H. Shoesmith, Mayford, Woking: 'Saffron.'

Mr. H. Lowe, Vicar Lane Nurseries, Tibshelf, Derbyshire: 'Pioneer,' 'Prince Charming' (to be renamed), 'Couleur de Rose' and 'Admirador.'

OCTOBER 23, 1939.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and thirteen other members present.

Tulip Fire.—Mr. Green showed a capsule containing seeds of *Tulipa Kaufmanniana* infected by the Tulip Fire fungus. Many small sclerotia were visible on the capsule and seeds. Germination was seriously impaired by the fungus.

Aphis on Rhododendron.—Mr Fox Wilson reported the first occurrence of the aphid, *Amphrophora rhododendronia* Mason, observed in this country on Rhododendrons. Specimens were shown of this insect, which is of American origin, and further observations will be made regarding its incidence and control.

Fuchsia.—A plant believed to be *F. parviflora* or *F.* × *parviflora Codringtoni* was shown by Mr. C. J. Howlett, Earley. Mr. Cotton reports that it is probably a garden form of *F. microphylla* or a hybrid with that species as a parent.

Dahlia coccinea.—Dr. Balfour Gourlay showed *D. coccinea* collected in E. K. Balls' Expedition. The particular specimen was larger in leaf and flower than those described from earlier collections.

Monarda.—A plant shown as *Monarda* sp. (E.K.B. 5525) by Dr. Balfour Gourlay was referred to Kew for identification, but that has not yet been possible.

Berberis vulgaris asperma.—Mr. E. W. Mooring of Witley, Surrey, sent fruits of *B. vulgaris asperma.* (1) The fruits of two bushes grown from suckers taken from the original seedless bush in 1934 at Chiddingfold, almost all contained one good seed. (2) The fruits from three bushes raised from suckers taken in 1938 from a bush at Selborne in most cases also contained single seeds. (3) The fruits from a bush grown in a pot and raised from a cutting of the plant referred to in (1) were larger, and in most instances contained one or two seeds, but there were a few smaller seedless ones.

OCTOBER 24 AND 25, 1939.

FRUIT AND VEGETABLE COMPETITIONS FOR AMATEURS.

CHIEF AWARDS.

FRUITS.

The Gordon-Lennox Challenge Cup, for the most meritorious display of fruits staged by an amateur in the competitive classes.

To Howard H. Crane, Esq., Eastcote.

The Affiliated Societies Challenge Cup, for the best eighteen dishes of Apples and Pears staged by an Affiliated Society.

To the Reading and District Gardeners' Mutual Improvement Association.

Class 1.—Collection of twelve dessert varieties of Apples.

First Prize, Fruiterers' Company's Silver-gilt Medal and £5.

To Howard H. Crane, Esq., Eastcote.

Class 11.—Collection of twelve culinary varieties of Apples.

First Prize, Fruiterers' Company's Silver Medal and £5.

To J. H. Louden, Esq., Wye (gr. Mr. J. Bond).

Class 22.—Collection of twelve dessert varieties of Pears.

First Prize, Silver-gilt Hogg Medal and £5.

To R. R. H. Moore, Esq., Cheltenham (gr. Mr. H. B. Willis).

VEGETABLES.

The R.H.S. Vegetable Challenge Cup, for the highest number of points in the vegetable classes.

To Mrs. H. L. Hansard, Little Bookham (gr. Mr. J. Wynn).

Class 32.—Collection of twelve kinds of vegetables.

First Prize, The Sutton Cup and £8.

To Mrs. H. L. Hansard, Little Bookham (gr. Mr. J. Wynn).

A lecture was given by Mr. F. J. CHITTENDEN, F.L.S., V.M.H., on "The Garden in War-time." Chairman, Dr. H. V. TAYLOR, O.B.E., V.M.H.

OCTOBER 24, 1939.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, F.L.S., V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To Messrs. Allgrove, Langley, Slough, for collection of Apples and Pears.

Silver Hogg Medal.

To Barnham Nurseries, Barnham, Sussex, for collection of Apples and Pears.

To Messrs. Cheal, Crawley, Sussex, for collection of Apples and Pears.

To Messrs. Laxton, Bedford, for collection of Apples and Pears.

Bronze Hogg Medal.

To Swanley Horticultural College, Swanley, Kent, for exhibit of Apples packed for market.

Silver-gilt Knightian Medal.

To Messrs. Dobbie, Edinburgh, for collection of Potatos.

To Messrs. Toogood, Southampton, for collection of vegetables.

Silver Knightian Medal.

To Messrs. Ryders, St. Albans, for collection of vegetables.

Other Exhibits.

Mr. A. Bayley, Orchard Bungalow, Lent Rise, Burnham: collection of seedling Apples.

Mr. F. J. Blinkhorn, Half Yoke, East Farleigh, Kent: Apple 'Levett's Cox.'

Mr. C. E. Camp, 13 Mansfield Street, Quorn, Loughborough: Apple 'Camp's King.'

Mr. J. Canning, Broome Park, Betchworth, Surrey: Apple 'Granny Smith.'

Mr. C. F. Charlton, Walkeringham Manor, nr. Doncaster: Apple 'Burton's Beauty.' This variety was found to be identical with 'Mère de Ménage.'

Mr. L. H. Chase, Chertsey, Surrey: Raspberries.

Mr. F. R. Davis, Rozanne, 53 Quaker's Lane, Potters Bar: Seedling Apple.

Mrs. A. Desborough, Tugley Wood, Broadstone, Dorset: Seedling Apple.

Mr. W. H. Divers, Westdean, Hook, nr. Surbiton: Apples 'Colonel Yate' and 'Old Pearmain.'

Sir Arthur Hill, 49 Kew Green, Kew : collection of Apples.

Captain H. G. Hawker, Strode, Ermington, South Devon : Apple ' Saltcote Pippin.'

Mr. C. J. Howlett, Earley : Apple ' Lewis Incomparable.'

John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19: collection of seedling Apples.

Mr. W. H. Judd, 84 Derby Road, Grays, Essex : Seedling Apple.

R.H.S. Commercial Fruit Trials, Wisley : collection of Apples.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :—

Gold Medal.

To J. Pierpont Morgan, Esq., Watford, for stove and greenhouse plants (gr. Mr. F. A. Steward).

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Engelmann, Saffron Walden, for Carnations and Gerberas.
To Messrs. J. B. Riding and J. F. Spencer & Son, Hockley, for Dahlias.

Silver Flora Medal.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.
To Messrs. Wood, Taplow, for Michaelmas Daisies and Chrysanthemums.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Begonias.
To Messrs. Perry, Enfield, for herbaceous plants.
To Messrs. Vinten, Balcombe, for Chrysanthemums.

Flora Medal.

To Messrs. Barr, London, for Korean Chrysanthemums.
To Mr. J. T. West, Brentwood, for Dahlias.

Banksian Medal.

To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Carlile, Twyford, for Michaelmas Daisies, etc.
To Messrs. G. & A. Clark, Dover, for herbaceous plants.
To Messrs S Low, Enfield, for Carnations.
To Mr. A. Miles, Bickley, for Korean Chrysanthemums.
To Messrs. Redgrove & Patrick, Sevenoaks, for herbaceous plants and Roses.
To Messrs. Wheatcroft, Nottingham, for Roses.

Award of Merit.

To Nerine ' Alice ' as a variety for exhibition (votes unanimous), from Lionel de Rothschild, Esq., Exbury (gr. Mr. F. Hanger). See p. 567.

Other Exhibits.

Rt. Hon. Anne Lady Brocket, Ware : Salvias.
W. B. Cranfield, Esq., Enfield Chase : Nerines.
Hon. Mrs. A. Gardner, Worplesdon : ornamental Gourds.
Mrs. Hopkinson, Coulsdon : herbaceous plants.
Mr. C. J. Howlett, Earley : Fuchsia ' Queen Mary ' (to be seen again).
Messrs. Luxford, Sawbridgeworth : Chrysanthemum ' Fernanda.' **A.M.** 1938.
Mr. R. Murrell, Hemel Hempstead : Rose ' Langley Gem ' (to be seen again).
Lionel de Rothschild, Esq., Exbury : Nerines.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-six other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Russell, Windlesham, for ornamental berried and foliage shrubs.

Silver Flora Medal.

To Messrs. Cheal, Crawley, for ornamental berried and foliage shrubs.
To Messrs. Hillier, Winchester, for ornamental berried and foliage shrubs.
To Messrs. Stewart, Ferndown, for ornamental berried and foliage shrubs.

Silver Banksian Medal.

To Mr. Sophus Coutinho, Royal Botanic Gardens, Kew, for succulents.
To Messrs. Jackman, Woking, for flowering and berried shrubs.
To Mr. E. Ladhams, Elstead, for ornamental berried and foliage shrubs.
To Mr. W. J. Marchant, Wimborne, for ornamental berried and foliage shrubs.
To Messrs. Notcutt, Woodbridge, for ornamental berried and foliage shrubs.

Flora Medal.
To Mr. K. W. Harle, Lower Basildon, for succulents.
To Knap Hill Nursery, Woking, for ornamental berried and foliage shrubs.
To Mr. E. Ladhams, Elstead, for rock-garden plants.
To Messrs. Whitelegg, Chislehurst, for flowering and berried shrubs.

Banksian Medal.
To Messrs. Burkwood & Skipwith, Kingston, for flowering and berried shrubs.
To Messrs. Constable, Southborough, for Lilies.
To Messrs. Elliott, Stevenage, for Gentians and other rock-garden plants.
To Messrs. Ingwersen, Sharpthorne, for Gentians.
To Orchard Neville Nurseries, Baltonsborough, for rock-garden plants.
To Messrs. Reuthe, Keston, for evergreen shrubs.
To Mr. J. Robinson, Eltham, for rock-garden and border plants.
To Mr. J. Southgate, West Ewell, for succulents.

First-class Certificate.

To *Mahonia lomariifolia* as a hardy ornamental-foliaged and flowering shrub (votes 12 for), from Major Lawrence Johnston, Chipping Campden. See p. 566.

Award of Merit.

To *Centaurea dealbata* var. *Steenbergii* as a hardy flowering plant (votes unanimous), from Messrs. Perry, Enfield. See p. 566.

To *Cotoneaster Wardii* as a hardy ornamental-fruiting shrub (votes 10 for), from Mr. W. J. Marchant, Wimborne. See p. 566.

Preliminary Commendation.

To *Berberis sp.* K.W. 5936 as a hardy ornamental-fruiting and foliage shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury.

Other Exhibits.

Messrs. Cheal, Crawley: *Berberis* × *rubrostilla*, Crawley Variety.

W. Balfour Gourlay, Esq., Cambridge: *Dahlia coccinea*, E.K.B. 5217, *Monarda sp.* E.K.B. 5525.

C. J. Howlett, Esq., Earley: *Fuchsia fulgens.*

The Director, Royal Botanic Gardens, Kew: *Lilium longiflorum* var. *eximium.*

Messrs. Lane, Berkhamsted: conifers.

Messrs. Neale, Worthing: succulents.

Messrs. Toogood, Southampton: rock-garden plants.

Mrs. H. L. M. Tritton, Chelmsford: *Gentiana sino-ornata.*

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen other members present.

Awards Recommended :—

Silver Flora Medal.
To Messrs. Charlesworth, Haywards Heath, for a group of Orchids.
To Messrs. Stuart Low, Jarvis Brook, for a group of Orchids.

Silver Banksian Medal.
To Messrs. Sanders, St. Albans, for a group of Orchids.
To Messrs. McBean, Cooksbridge, for a group of Orchids.

Award of Merit.

To *Laeliocattleya* × 'Karen' var. 'Magnificent' (*L.-c.* × 'Sargon' × *C.* × *Peetersii*) (votes 9 for, 4 against), from Messrs. H. G. Alexander, Tetbury. See p. 566.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and seven other members present.

Exhibits.

Messrs. Allwood, Haywards Heath: Carnations 'Clayton Crimson' (to be seen again); 'Royal Tapestry,' previously named 'Royal Chintz' (to be seen again); and 'Autumn.'

Lieut.-Colonel P. E. Colman, D.S.O., M.C., White Lodge, Harefield Place, Uxbridge: Carnation 'Sunburst' (to be seen again).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN, O.B.E., M.C., in the Chair, and eight other members present.

There was no business before the Committee on this occasion.

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ERRATA AND CORRIGENDA.

P. 131, line 2 from bottom, for *Arisaema candidissima*, read *Arisaema candidissimum*.

P. 132, line 7, for *A. consanguinea*, read *A. consanguineum*.

P. 132, line 13, for *A. triphylla*, read *A. triphyllum*.

P. 133, fig. 20, for *Arisaema candidissima*, read *Arisaema candidissimum*.

P. 232, line 3, for *Soulangeana*, read *Soulangiana*.

P. 277, fig. 63, for A, B, C, D × 45 E × 450, read A, B, C × 45. E × 450.

P. 282, line 35, for (fig. 66C), read (fig. 66A).

P. 285, fig. 66, line 4, for oogonium, read oospore.

P. 285, fig. 68, line 5, for 450, read 260.

P. 297, line 10 from bottom, for *C. Tomasiniana*, read *C. Tommasiniana*.

P. 298, line 28, for *Salviax superba*, read *Salvia* × *superba*.

P. 332, fig. 78, for *Olearia myrsinites*, read *Olearia erubescens*.

P. 336, line 13, for *Arisaema sikokiana*, read *Arisaema sikokianum*.

P. 406, line 41, for San Franciso, read San Francisco.

P. 419, line 13, for *carolianium*, read *carolinianum*.

P. 422, line 8, for *L. columbianium*, read *L. columbianum*.

P. 433, line 13 from bottom, for Rheintocher, read Rheintochter.

P. 531, line 25, for Glower, read Glover.

P. xxvi, line 13 from bottom, for *Berberis Geraldii*, read *Berberis Giraldii*.

P. liii, line 2 from bottom, for *Merendera sobilifera* (*Colchicum sobiliferum*), read *Merendera sobolifera* (*Colchicum soboliferum*).

P. lxxxviii, line 6, for Caedom, read Caedmon.

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